

AVIATION WEEK

A MCGRAW-HILL PUBLICATION

NOV. 19, 1951

50 CENTS

Sir Isaac never dreamed of anything like this!

Back in the 17th century, even Newton couldn't have foreseen the day of automatically controlled flight. Yet the principles he expounded make it possible for this plane to hold so steady in a bank that a precariously perched glass of water isn't even disturbed!

One of those principles—his first law of motion—is the basis for the formula governing gyro behavior. Honeywell engineers, following this lead, designed a vertical gyro second to none, that is the heart of the dependable Honeywell Autopilot—standard equipment on the B-36 and B-50—that's flying the airplane pictured here. By always knowing which way is up, the gyro vertical, together with other autopilot components, operates the control surfaces to coordinate aircraft turns.

Today Honeywell specializes in gyros; is the nation's fastest-growing manufacturer in this important field. Honeywell rate gyros used in the yaw damper control now are installed on six major types of aircraft. Still other Honeywell gyros, some so versatile they measure angular rates as slow as $\frac{1}{4}$ of a degree a minute and as fast as 45 degrees a second (a 10,800 to 1 range of angular rates), are used in the radar and guided missile programs.

Experiments to improve and find new applications for gyroscopic controls are constantly being made by Honeywell engineers. We are broadening our research in this and other fields of control—because *automatic control* is such an important part of aviation progress. And *automatic control* is Honeywell's business.

Aeronautical Division
MINNEAPOLIS-HONEYWELL • MINNEAPOLIS 8, MINN.

MINNEAPOLIS
Honeywell

Aeronautical Controls



RELIEF VALVES • HYDROL-ANTI-SKID BRAKING SYSTEM • REMOTE CONTROL POSITIONERS •
 S • GATE VALVES • SLIDE VALVES • PUMPS • PLUG VALVES • HYDRAULIC SHUTTLE VALVES •
 SOLENOID VALVES • SNIFFLE VALVES • LOX VALVES • VENT VALVES • PURGE VALVES • SNIFF
 MOTOR-OPERATED FUEL SHUT-OFF VALVES • PRESSURE-OPERATED HOT AIR SHUT-OFF VAL
 SEQUENCE VALVES • REGULATORS • JET ENGINE ACCESSORIES • RELIEF VALVES • SEQUENC
 FUEL PUMPS • VENT AND RELIEF VALVES • VALVES • SLIDE VALVES • PUM
 • HYDRAULIC CHECK VALVES • SHUT-OFF FUEL SHUT-O
 FUEL SELECTOR VALVES
 GATE VALV
 LOX VALV
 FILTERS
 REGULATORS
 PRESSURE SWIT
 PRESSURE REGULATORS
 PNEUMATIC ACCESSORIES
 ELECTRO-MECHANICAL ACTUATORS
 HYDRAULIC RELIEF VALVES
 HYDROL-ANTI-SKID BRAKING SYSTEM • MOTOR-OPERATED FUEL SELECTOR VALVES • COM
 PNEUMATIC VALVES • FLOAT SWITCHES • MOTOR-OPERATED HOT AIR SHUT-OFF VALVES •

**EVERY BOMBER,
 EVERY FIGHTER,
 EVERY TRANSPORT
 IS HYDRO-AIRE EQUIPPED**

Hydro-Aire

/INCORPORATED

Barbours, Calif.

B.F. Goodrich



Rubber boot cushions a fuel line's kick

IN THE FLYING BOSS—Boeing's new device for high pressure fuel—its rebelling—the greater pressure has to be shut off suddenly at the nozzle. That posed a problem to the designers because the surging fuel would deliver a strong kick to the pipe—like moving all a water faucet too quickly. Damage to the mechanism might result.

Doing engineering had no idea on how to cushion the job. It was a section of perforated metal fuel line, surrounded by a surge boot—two rubber diaphragms inside another with no air chamber between them. The pressurized air within the boot would provide the

cushion to absorb the kick.

The only kick you could a boot be made that would do the job? They came to B. F. Goodrich for the answer. It had to be light in weight, yet strong enough to take the impact of the surging fuel. It had to remain flexible at low temperatures. It had to be fastened to metal end fittings with an airtight, liquid-tight seal.

B. F. Goodrich engineers went to work on the problem. They came up with a new material for the endograft—non-stick rubber on nylon fabric. It is light in weight and does not adhere from seal. They found a way to form

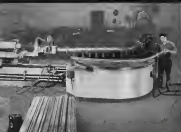
a 100% effective seal between the sleeves and the end fittings. The whole assembly weighed only 15 pounds.

Put in the end, the new BFG surge boot did the trick, prevented dangerous kicks to the fuel pipe. Its another example of the effective solutions to serious problems developed by B. F. Goodrich engineering and research. The B. F. Goodrich Company, Aero Section Division, Akron, Ohio.

B.F. Goodrich
FIRST IN RUBBER

BATH the machine that forms ALL the shapes

SHEETS, EXTRUSIONS, TUBING, ROLLED AND FORMED SHAPES



Above: Stretch forming and twisting around a compound curve in a multiplicity of planes.



Showing finished stretch-forming after shaping and heat treating at Bathing. Full vertical flexibility is ensured by both ram and table cylinders.



Illustrating the largest sheeting principle on a light section at Bathing. Sheet machine will handle from 1,000-lb. to 100,000-lb. pull.

Four More Leading Aircraft Manufacturers Have Chosen BATH Contour Forming Machines

The BATH machine provides the 14 essentials of a UNIVERSAL Contour Former. It is the only machine that can form virtually all the shapes that will be required in future aircraft design.

Hundreds of shapes, with compound curves and varying radii in many planes, are being formed on BATH exclusively because no other machine can produce them. Read the 14 essentials listed below and you too will choose BATH — for only BATH provides them all:

TYPICAL DIE SET-UPS



Aluminum gun barrel rings are constantly formed to complete shells for various aircraft.



Large corrugated aluminum sheets extruded to form on the BATH machine.



Left: Photo illustrates how typical aircraft skin sections are stretch-formed on the BATH Contour Former. Rotating table enables die panels forming sheets work round any combination of curves.



Showing standard "X" extrusion being formed on both horizontal and vertical curves.

Only BATH Provides ALL These Features

1. Stretch and compression forming on one machine. Two-way rotating cylinders and reversible table allows choice of forming method best suited to part.
2. Either sheets or extrusions are formed on the same machine. Jaw members are movable and adaptable to any cross section.
3. Temperature, irreversible, low by law, forming on a rotating table permits small capacity machine to do the work of a heavier one.
4. Heavy sections and parts that cannot be stretched, may be wiped or roll formed.
5. Full circles or spirals are formed in one setting for most any alloy.
6. Long parts up to 22 feet in length, can be stretch formed without re-setting jaws or dies.
7. Designed to stretch-form reverse bends without releasing tension on material.
8. Concentrated application of full tension over small area, at a time, permits angularity change on extrusions while contours are being formed.
9. Fast lighting. Die is mounted on table and stretch heads, upper dies or roll cylinders, can then be easily adjusted to handle skewed.
10. Pipes or Rolls in Two Planes: Produces parts with both horizontal and vertical curves simultaneously.
11. Material can be twisted while being formed in varying horizontal and vertical planes.
12. Safety: Over 10 years of operation have resulted in no known accident to an operator. Machine damage is prevented by floor pins at critical points.
13. Built to Machine Tool Standards: Deep sections eliminating machine deflection, causes constant pressure and duplication.
14. Fast production per hour with very low scrap loss, rarely forming 1%.



Above: Jet engine rings, aircraft, auto, frame tubes, cylinders and casings are formed in either full circles or spirals.



Showing how full circles and spirals are formed on BATH machine.

THE CYRIL BATH COMPANY

7045 MACHINERY AVENUE • CLEVELAND 3, OHIO



IN THE NEWS TURBOPROPS

The Turbine, most powerful propeller-type aircraft powerplant in the country, delivers more than 8000 horsepower in thrust on an unfueled arrival of Pratt & Whitney, Jim Lohrman, manager of G-E's Aircraft Gas Turbine Division, and Vag Weener, in charge of the Turbine project, take a look at the engine on the stand where it is undergoing rigging tests.

Ten years ago, in July, 1941, G-E engineers started work on a new type aircraft powerplant—an axial flow gas turbine driving a propeller. This was the TG-100, the first turboprop in the country and the forerunner of future powerplant engines.

General Electric engineers today are experimenting with the Turbine, a turboprop development. Although larger than engines for today's transport needs, the Turbine gives us a solid vehicle for testing new ideas and methods.

New and improved turboprop engines are in the books at General Electric. Light weight and high power, these engines will someday be lifting new aircraft in new uses and new records.

When you're considering powerplants, call in the company that pioneered the aircraft gas turbine engine. Turbine was General Electric's aviation specialist, or write General Electric Company, Schenectady 5, N. Y.



Convair XF-51, first turboprop-powered aircraft to fly in U.S., powered by TG-100, first American turboprop.



Design engineers Alan Howard and C. J. Walker, inspect an early TG-100 turboprop on test stand at Schenectady.

AIRCRAFT GAS TURBINES

GENERAL ELECTRIC

NEWS DIGEST

DOMESTIC

Deliose Production Administration has granted CAA's appeal for leave time to continue essential airport construction the first quarter of 1952. Steel for these projects earlier was reported tentatively cut by DPA (Aviation Week Nov. 12, p. 15).

It. Gen. Juan Doolittle perished at the wrecking of a 15 ft. plane carrier because a loose object caught at the late Walter H. Bosch at the Bend Aircraft Corp. plant at Wichita Nov. 11. Doolittle had tribute to Bosch's "courage and faith in himself" as founding the company in 1912, at the bottom of the depression. Bosch's widow, Olive Ann, now president at the corporation, and their two daughters were present for the wedding ceremony.

Military Air Transport Service has been awarded the USAF Douglas Trophy for Air Safety. MATS had lowest accident record rate in AF during 1950.

Shipments of 179 civil planes valued at \$5.5 million, and 391 civil aircraft engines during August was reported by Cessna Systems. Total company with 207 planes and 190 engines shipped during July. Total aircraft employment, an increase and engine plants (civil and military) in August was 392,351.

Kil Devil Hills Memorial Society has been organized to form a national monument in honor of the Wright Brothers' first flight at Kil Devil Hills, N. C. Group is planning Glendale, Arizona observance of flight in 1911. Plans the underway for annual observance since Dec. 17.

Chicago and Southern Air Lines has contracted for eight 44-passenger Convair 440s, with an option to purchase two more. Deliveries will start in June 1952. Company in tests scheduled online in order 140s.

Electronic research laboratory will be built by USAF for \$28 million, on 100 acres adjoining Major Hanscomb Airport, Bedford, Mass. Facility will house the electronics research program headed by Massachusetts Institute of Technology, the Air Force lab at Cambridge, and the population laboratory temporarily located at Watertown Arsenal.

Tennessee Air Lines 2-0-2 crash at Tennessee, N. M., Nov. 5, occurred

when the left wing tip of plane hit the ground during a turn into the final approach, states a TAI official. Preliminary investigation by the airline indicates that the plane was not at fault and was functioning normally up to the time of impact. Of 26 Army personnel aboard and crew of three, one passenger died. (Aviation Week Nov. 12, p. 37).

Kenneth R. Ferguson was named by Undersecretary of Commerce for Transport Deles W. Rensel to replace him as a member of the Aircraft Production Board of DPA. Ferguson formerly was vice president operations and engineering for Northwest Airlines, will represent civil aviation in the coordination of aircraft production in the defense program.

FINANCIAL

Jack & Henry, Inc., Cleveland, reports \$496,550 net income as order at \$5,998,325 for the three months ended Sept. 30, with earnings for the same months at that date being \$1,505,144 on net sales of \$15,755,737. It's profit added backlog as of Oct. 25 was \$42 million.

Mid-Continent Airlines, Inc., had a net income profit of \$15,393 for September after payment for aircraft stock at the 1950 sales. Net profit for the first nine months of this year is given as \$165,555, with operating revenues being \$7,224,399 for the period.

INTERNATIONAL

First Canadian-built aircraft to be furnished to the USAF was formally delivered Nov. 13. Plane was a de Havilland 124A Beaver reconnaissance and surveillance plane.

Canadian government orders for aircraft parts, overhaul and engine repairs Sept. 16-18 totaled \$7.5 million, with \$3,075,000 going to McDonnell Douglas Aircraft Co., St. Louis, for aircraft modifications. About \$100 million was spent on aircraft production during the first half of the current Canadian fiscal year, Apr. 1-Sept. 30.

Foreign nations receiving special aviation training in the U. S. numbered 54 under government grants made to fiscal 1951. Most (56) of the trainees were headed by CAA, learning air traffic control, air navigation electronics, radio aids, airport management, airport design and construction, safety and communications.

The Right Move for ECONOMY



300-1700 Hz COMPASS RECEIVERS

DUAL POINTER ADF INDICATORS

APPROVED TYPE RADIO ADF

SINGLE POINTER ADF INDICATORS

AVIATION ACCESSORIES
P. O. Box 4222
CHICAGO 90, ILL.
WHY WORRY A. T. HARRIS

**FOR THE TOUGHEST JOBS
PICK THE HUSKIEST**



Model R220 photo-grapher with a fountain pen to show compact size and design.

The huskie model TrimTool—R-220 and R-174—are long used in increasing quantities where great strength and endurance are required. Lightly so. Although these models weigh only 3½ pounds, they have an ultimate static load capacity of 2,400 pounds/inches and operate loads over 300 pound-inches through 160° rotation. Zero backlash, magnetic brake, adjustable built switches, positive

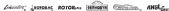
overtravel stops, adjustable position-indicating potentiometer, and built-in safety magnet filter are features of these TrimTools.

Models R-220 and R-174 are identical in performance, but differ in mounting service means.

The newer, lighter TrimTool—R-420 and R-422—weigh 2½ pounds, have an ultimate capacity of 1,500 pound-inches.



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100 AIRPORT CIRCLE, DALLAS TEXAS • CHICAGO ILLINOIS



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AVIATION CALENDAR

Nov. 23-24-Southeast Sounding Meet-
ing, sponsored by the Elmore Ave Sounding
Corporation, Elmore, N. Y.

Nov. 27-30-Aviation Distribution and Man-
ufacturers Assn. meeting, Waldorf-Astoria
Hotel, New York.

Nov. 28-30-National convention of the
American Rocket Society, Atlantic City,
N. J.

Nov. 30-Dec. 5-Meeting of the American
Society of Mechanical Engineers, Chal-
lotte Hotel, Charlotte, N. C.
For information write: Ernest Hartley,
40 W. 39 St., N. Y. 18, N. Y.

Dec. 4-5-Transport aircraft hydraulic sys-
tem and system conference, sponsored
by Valiant International, Hotel Sheraton,
Detroit.

Dec. 5-7-Feedback Controls System, Chal-
lotte Hotel, Atlantic City, N. J.

Dec. 17-Weight Reduction Lecture, spon-
sored by the Institute of the Aeronautical
Sciences, U. S. Chamber of Commerce
Auditorium, Washington, D. C.

Jan. 26, 1959-Southeast States Air Show,
sponsored by the Florida Air Ports Assn.,
Opa Locka Airport, Florida.

Jan. 28-29-2nd Great Debaters Meet-
ing, Allen Hotel, Wichita, Kansas.

Jan. 28-Feb. 1-13th Annual Meeting, the
Institute of the Aeronautical Sciences,
Astor Hotel, New York.

Jan. 29-31-13th National Meeting of the
American Meteorological Society, Roca-
re Hotel, New York.

March 1-6-Institute of Radio Engineers,
Waldorf Astoria Hotel & Grand Central
Palace, New York.

March 17-18-Second Midwest Conference
on Fluid Mechanics, to be held at
Ohio State University.

March 19-22-American Society of Test
Engineers, International Amphitheatre,
Chicago, Ill.

PICTURE CREDITS

1-30-1958-1959: (Doubtless AD-42)
Howard Levy, (Doubtless PD-11) 1958,
11-1959, (19-1959), 20-1959,
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AIRCRAFT OXYGEN BREATHING EQUIPMENT

THE SCOTT "A-15"

Portable Automatic Diluter Demand
Oxygen Walk-Around Assembly.

Standard equipment on U.S.A.F.
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converters. New units in pro-
duction and available to
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U.S.A.F. Type A-1 Cylinder and Regulator Assembly consists of U.S.A.F. Type A-15 Low Pressure Diluter Demand Oxygen Regulator. (Designed and produced by Scott, Automatically mixes air and oxygen, supplying correct air-oxygen ratio for all altitudes up to 34,000 feet.)

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WHO'S WHERE

In the Front Office

Ken O. Ryan, Avionics manager of Convair, with since 1946, has been promoted to vice president/manufacturing and will transfer to the company's general office in San Diego. Before coming to the 711 Waco division in 1948, Ryan for six years was with the firm at Volter Field, Downey, Calif. In other Convair posts, August C. Bowers has moved up to become division manager at Ft. Worth, and Frank W. Davis has been designated assistant chief engineer in charge of research and development at San Diego.

Murray E. Jones has been appointed vice president for Convair's Sales and Design, Inc., management consultants, in divided divisions and divisions, at New York City. In the late 30s Jones joined Glenn L. Martin Co. and rose to the position of chief of emergency controls administration.

Richard R. Mook, president of Linc, Inc., Kenneth MacGarity, a Lead designer and vice president of Whittier Corp., and Paul Moore, Lead designer vice president and general manager of Linc, comprise the firm's new executive committee. Mr. Moore was also elected as treasurer of the same outfit.

Changes

Earl Lewis has been named chief engineer of LEO Corp.'s Electronics division. Lewis has been with Edo for years and has been associated with development of new naval and underwater detection devices.

Richard Goldstein has joined Hawley Aero Tools Corp., Buffalo, as technical editor and will direct all of the firm's publications. Jack Mathias has been named assistant technical editor of the firm's Engineering & Mfg. Co. Division. He previously was managing technical editor at Lockheed.

William L. Mervin has been designated manager of Lark Aviation Inc.'s Division of Sales. He previously was COO of the Metal Business Center Systems at General Air Air Service.

Edward F. Houston, formerly sales manager with Wright International Corp., has been promoted to the same post with Service Corp. of America, Wilmington, Calif., and James E. Eddy has been made general manager.

Paul H. Mervin, previously with GNA, has joined Edo Air Lines in operations division.

Paul A. Bower has been made assistant general manager/purchasing service with United Air Lines and will be based in Kansas.

Honors and Elections

Ernest H. Wrenn, with the International Union of GNA, has received the Al Martin decoration from the president of Convair for his work during a two-year tenure in that capacity helping to improve civil aviation.

INDUSTRY OBSERVER

Following industry notes were made in an Aviation Week edition during a recent visit to the Detroit area.

▶ If Ford completes negotiations now in progress to produce a convertible part of the Pratt & Whitney J57 package, the Dearborn company will have no more work on three of the most important engines in the national defense program. Ford is already hard at work in Chicago in producing production orders on the biggest piston engine in the defense program, the Pratt & Whitney R-4500. And Ford's Lincoln Mercury division is waiting for Navy production on a giant to build Ford's 157 engines for the Navy's top jet-powered, carrier-based Ford's J57 engines don't call for building the complete engine, but that can come later.

▶ Ford's mother-in-law, but little known a part of the Air Force's multi-engine division on the four-engine Boeing B-47C last summer. One of the major results of the division is to make mass production of the C-119, the B-47C, and the Chevrolet Division, General Motors Corp., pulled out of the program to build the Allison J35-A23 turboprop (re-designated J-71). Instead of building the Allison jet engine, Chevrolet got a contract to produce the Wright R-3350 piston engine at Teterboro, N. Y. But that meant leaving the R-3350 division under the Lockheed Martin Co. to now it located that plant at the Ford plant. Ford found out it had lost the R-3350 contract, Kewanee Engine Co. offered Lockheed a 1st sub-contract to build assemblies of the Pratt & Whitney C-119. But Lockheed wouldn't go for it because of the R-3350 division. In the time Lockheed learned it had lost the R-3350 business, the R-3350 division had been placed under the Ford's control. The R-3350 division was left virtually empty-handed for awhile. Since then, Lockheed has been substantial aircraft sub-contractor for B-47C and C-119 assemblies.

▶ General Motors expects to be in a better position to be a General Motors New York, possible the new product of the Air Force's Arlington, Tex., plant, the short and 1953. Meanwhile, the Buick-Oldsmobile-Pontiac Assembly division is moving down roadways, to be stored in a building at Grand Prairie Airport, well away from its Arlington.

▶ Ford is going to put the "main" planting with the B-47's wing which it will build for Boeing, Douglas and Lockheed, meeting its considerable expense of contract over the original program. This effort for the three major manufacturers to install the B-47s after that got the wings from Ford. Plant which work will be done in near Kansas City.

▶ Some Detroit observers see a new error for Labor union discussions building up plant disposal. The Detroit local are reported unhappy about losing their members' share of work as being transferred to other auto companies' aircraft and defense plants, thus making workers and two powerful unions and Detroit various other local unions. Looking for the national union leadership to swing its very considerable political weight to prevent further manufacturing for labor just as the Lockheed-Boling agreement from Seattle to Wichita.

▶ There is some thought being given at least from the Ford side of the picture to Ford engineers' becoming the sole producer of Pratt & Whitney's R-4500 piston engines at the large Chicago engine plant now in a difficult looking up. This could happen if Pratt & Whitney gets locked up in negotiations on its jet engine program. An important factor in such future production will be how Ford's production turns out. Since the R-4500 is a complicated piece of machinery to make and build production at Chicago is probably more and a half as much.

▶ General Motors production of the Republic F-84F at Kansas City will get its first supplies shipment from Convair Wright Corp. But even if the 1,400 Super 800 production of the F-84F division at Pratt and Chicago, Detroit on the F-84F program at Republic, due to a new jet engine capacity problems, is expected to be held before it starts GM's production schedule.

Washington Roundup

All-Out For Air Power

"Balanced forces" remains the policy of the top U. S. military command—but it doesn't mean what it used to mean.

Formerly it meant three co-equal services. These were the years when service prestige was taken more seriously than the threat of war, years in which the hope for peace was bright enough to keep military spending down to \$11 billion a year.

New "balanced forces" means forces balanced to meet the threat of war. And that means major emphasis on air power—to win control of the air and deliver atomic bombs of "various sizes" on enemy targets, as well as on strategic targets.

Chairman of the Joint Chiefs of Staff, Gen. Omar Bradley, who backed the post-Korea skeletonizing of the Air Force and Naval services, made the new concept of "balanced forces" official in a recent speech.

He explained:

• "When we speak of balanced forces, we mean effective forces equal to the task that modern warfare now thrust upon us . . ."

• "To meet the paper balance in our forces . . . we must buy substantially more in power . . ."

• "In spite of the fact that air power alone can never be decisive in total war, the air battle must be won if a war is to be won. In spite of all the new developments in the field of atomic energy and the various military applications, the airplane continues to be the best method of projecting the power of the atom to the battlefield, and to the heart of any large landmass nation."

• He added cautions against over-reliance on air power, though: "There are many military targets against which an atomic bomb would be ineffective or wastefully applied. If an enemy wanted to expend his forces so that soldiers walked 100 yards apart, they could march across Europe tomorrow as the face of the greatest modern power on earth seldom can now dare to stop them. However, if we have the means to make an enemy's air combat his focus, there are many methods available to destroy his military offensive power."

Strategic Air: Major USAF Aim

Although USAF's buildup from 95 to 141 wings as now planned would be predominantly in tactical strength, strategic air power would still dominate in USAF's composition.

The mission USAF will largely fill the strategic air mission on the collective defense plan against the Russian bloc, but make only a minor contribution to the tactical air mission. Air forces of the European nations, Turkey and others that may be brought into the plan will be heavily relied upon for the tactical mission.

USAF's main composition is secret, but this is a reasonable estimate of how the 141-wing USAF would be divided:

- 51 strategic air wings, all based in the U. S., with units periodically stationed at points around the globe under a rotation system
- 46 tactical air wings permanently based at points ringing Russia
- 32 air defense groups deployed in squadrons
- 18 transport groups for airlift of ground forces to theaters of action

Holding Down Army Aviation

Army's proposed \$700 million program for "major" transport helicopters will be delayed for a long while.

In competition with Marine Corps for procurement from inadequate production facilities, Army has put its program, involving large-scale purchase of the Chinook transport (Boeing NH-16) on hold as development, on the stall.

Army's present goals:

- To boost its airlift procurement program from approximately \$130 million this year to \$200 million next fiscal year, which starts in July. But the outlook in the Administration will hold it down to \$130 million in 1955.
- Increase aircraft purchases by another 50%, to around \$150 million the following year.
- By June, Army hopes to have:

• Back of an 18 divisions increased with 25 to 28 aircraft—16 four-wing, 18 utility helicopters. Helicopters are being put to new uses and won't replace less costly fixed wing craft for artillery spotting, message and supply dropping, ground reconnaissance, hoisting targets for aerial attack.

• Five transportation helicopter companies manned with 21 one-ton and two-ton copters. But the program is lagging. The two companies that have been organized are in training with smaller utility helicopters. First delivery of the transport copters hasn't been made. Companies probably will be quickly dispatched to Korea for evacuation and other special airlift jobs as soon as they're organized and equipped.

• In addition, "hundreds" of light planes attached to non-directional units.

Have plans a hard-carrying helicopter for anti-air warfare, but Army aviation command. "They're too large, too vulnerable to anti-aircraft fire, even artillery. The service has been low in that they're usually kept safely out of distance from enemy firing."

Here and there

• Rep. Robert Cramer, chairman of House Interstate and Foreign Commerce Committee, will fight to keep off-pay contracts for astronomical injuries, as provided in legislation passed by the Senate. Cramer also claims that the Senate measure doesn't set tough enough standards for fixing inter-atomic injuries in international and extra.

• Contract Formation-General Accounting Office is waging a last battle for authority to review all termination settlements by the military, but is expected to lose. In World War II, the military had authority to make final settlements, with GAO limited to post-audits for "fraud" only.

• Alendium Boarding-Over-stocking of supplies by major aircraft companies probably will be changed by the Senate Small Business Committee in a report due in a few weeks. Members of the staff have completed field investigations.

• Committee now is looking into construction of a new \$8-million plant by General Motors Corp. for production of aircraft landing gear wheels. Claim has been made that present site plant capacity could be used for production with a big saving in steel and machine tools.

—Katherine Johnson



ESCORTING THE MATADOR—Marin B-41 Matador (above) is followed by Republic F84 and F86 fighters. Having dropped its atomic load, the B-41 Matador is returning to base for the base for engineering study and is tracked by ground units. The photo just released was taken July 15, 1945.

Picture Highlights of the Week



ALL-WEATHER RAIDER—Douglas AD-6 Skyraider (right) has radar, de-ice and heater, making it suitable for operations day-and-night in all types of weather. Photo shows how it would look with four wings, large and small rocket propellers. AD's ability to carry heavy, varied armament built its sale to people for ground support in Korea.



BIG NIGHTHAWK—New Douglas F3D-1 Skyhawk (below) is one of Navy's big planes for future action over Korea. Heavily armed, it carries various ordnance in all weather suits. It is powered by two Westinghouse J34s.





NAA ATOMIC RESEARCH CHIEF, Dr. Clarence Burt, with model of new jet-cut reactor. The shown feature is located in the original structure. Control room is at right.

Atomic Reactor for \$1 Million

New North American Aviation development places research within budget limits of many institutions.

As atomic research reactor—the first to be within the budget of large industrial and industrial universities—has been designed at North American Aviation, Inc., for the Atomic Energy Commission. Component development and testing are underway at the company's Atomic Energy Research Dept. at Dayton, Ohio, and are scheduled for completion within nine months.

NAA's atomic furnace operates at the low pressure level equivalent of 150 atmospheres. In fact, in operation, a single change permits operation for ten years at 40 lb per sq in. Estimated cost to build the reactor has been figured at \$1 million.

• **Safety Features**—The reactor has a built-in safety device, said Dr. Clarence Burt, director of NAA's atomic work. In addition to the usual auto shut-off device to shut down the reactor, the design of the core is such that in an emergency case, the positive production goes down. (Negative production is necessary to sustain atomic reaction—without neutrons there is no atomic fire or explosion.)

Dr. Burt pointed out that a lot of important research could be done on the West Coast with short-lived isotopes, the major product of the reactor. Certain such isotopes must be shipped from AEC facilities at Oak Ridge, Tenn., or Brookhaven, Long

Island. In the case of having the material in hours, much of the strength is lost by the time they arrive at the coast.

The design of experiments are possible with the NAA reactor. The "isotope" type uses the neutron flow within the reactor in the second class, a neutron beam is fed through a post in the shield and used to irradiate objects outside the reactor.

The reactor can also be employed for general experiments in development and in the operational testing of scientific processes. Shape of the reactor is notional; it is 11 ft high, 19 ft wide, and weighs about 450 tons.

Burden Expected To Get AF Post

William A. M. Barden, Deputy Assistant Secretary of Committee for Air, probably will become the Assistant Secretary of the Air Force soon, according to Raymond A. Galtsoff, who has advanced to Undersecretary. Barden, a New York, university graduate and longtime student of international and civil aviation, is a former president of the Institute of the Aeronautical Sciences. He has been acting as a special consultant to the Secretary of the Air Force in recent months.

C-W Merges WAC

Following purchase of buildings of the recently (1951) stockholders in Wright Aeronautical Corp., Curtiss-Wright Corp. has merged WAC into its corporate entity and will thereafter operate it as the Wright Aeronautical division of Curtiss-Wright.

C-W, through a wholly owned holding company, Aero Holding Corp., previously owned about 95% of WAC's stock, the remaining 11,831 shares being held by slightly more than 300 owners. This majority interest was obtained by Curtiss-Wright through payment of \$115 cash for each share of WAC stock.

Plant Reactivation Costs \$28 Million

What does it cost to get one of our World War II aircraft plants out of storage and back into full production?

For a modern USAF modern jet bomber such as the Boeing B-47 Stratojet, it will cost about \$15 million, not counting labor or new construction, says Douglas Aircraft Co. production agent Harry Woodhead. He is now busy getting the company's Tulsa, Okla., facility in shape to turn out the Stratojet under license from Boeing.

A new flight test runway, 10,000 ft long, 200 ft wide, 16 in. thick, will cost another \$6 million. A new three-story electronics building it is to be completed early in February.

Just cleaning up the plant and getting it in shape to take the production machinery was a tremendous job. The Tulsa facility, said by Douglas as the last war jet B-26 bomber (now being used B-26 light bomber), had been relatively inactive during the postwar period, with most of material stored there in the USAF and the office reserved by the Army of Engineers.

Now about 2,000 shop employees are getting production facilities ready. Nearly 1,000 employees have been to work and doing repair jobs here located in the factory. A 7,000-ton press, scheduled for delivery, is larger than any now being built by Douglas in any of its plants.

Sometime this month Woodhead expects to start blossoming small new plants for the B-47. B-47 production has not started yet next year when approximately 14,000 employees will be working. The total will go up to about 20,000 when the plant finally has started.

Douglas has spent about \$7.5 million in Oklahoma to get the plant in shape this far, with most of the \$5 million of the going to funds in the Tulsa area.

FIRST



WRIGHT BROTHERS — making history's first successful flight — called an "Maiden"



PAN-AMERICAN scores top performance on long overseas flights with Mobiloid Aero!



MORRIS AERO helped Jan de Bont on record breaking run to capture highly prized Bendix Trophy!



MORRIS AERO used special technique to protect with lubricants by the means of Mobiloid!



NEW AVIATION lubricants and fuel are being constantly developed by Research-Vacuum engineers!

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The Flying Red Horse Paces Air Progress!

• Mobiloid first flew with the Wright Brothers back in 1903 — has since flown with leading air pioneers... Lindbergh, Wiley Post, Amelia Earhart, Joe de Bont and others.

The makers of Mobiloid have been "out front" in developing products to meet progressively

changing operating conditions — higher engine heat, longer range, greater speed and altitude.

So will wonder leading aircraft engine builders approve Mobiloid Aero... why it is found at hundreds of U. S. airfields.

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Here is What CLARE Hermetic Sealing Means:

After assembly to the enclosure, the enclosure is subjected to a high vacuum pump-out process, then a 150 atmosphere pressure to remove all traces of moisture and gases.

While under this extreme vacuum, the enclosure and seals are sprayed for signs of a Mass Spectrometer—by means of a mobile unit that can detect a leak so tiny that more than thirty one years would be required for one cubic centimeter of air to pass through it. The highly refined method of leak testing, common practice of today, enclosures which would pass the second conventional test without detection.

For most applications, the enclosure is then filled with dry nitrogen, which has a relatively high average potential.

Write for CLARE Bulletin No. 114

CLARE Hermetically Sealed Relays Protect Against These Conditions:

- Moisture, High Humidity and Ice
- Salt Air and Spray
- Fungal Growth
- Wobbling Air Pressure
- Variation of Air Density
- Dust and Dirt
- Corrosive Fumes
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CLARE Hermetically Sealed Relays are available so that no gas or liquid can enter or escape.

This ideal condition, now available to carry out all CLARE hermetically sealed relays, is the result of many years of painstaking research by the CLARE organization to produce a perfectly sealed relay at a reasonable cost to industrial relay buyers.

Hermetically sealed in an ideal atmosphere of dry inert gas, they are permanently immune to the different climates and environmental conditions responsible for 90% of the failures of exposed electrical apparatus.

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AERONAUTICAL ENGINEERING

British Research—Quality, No Quantity

- There's not much of it, but what there is is good.
- And it's well prepared for tomorrow's weapons.

By David A. Anderson

London—A look at British aeronautical research—as typified by the exhibit of the Ministry of Supply at the RAE display—did not show anything startling on new. But it did indicate that the British are well-established in the very on fields which bear on tomorrow's weapons, including guided missiles. And it conveyed that British research, like British production, while small in quantity—by U. S. standards—is high in quality.

This aerospace exhibit dealt only with the AGO research—progress which would parallel the work of our own NACA, for example—and did not give an inkling of the work being done by secret manufacturers. This latter is extensive, and some of the basic research effort in England, that the firm now believes is in the category of trade secrets.

■ No. 1 Exhibit—The drawing and of the display was the latest rocket-powered test vehicle shown by RAE, in order to investigate the problems of supersonic flight.

The vehicle is about 15 ft. long and 17 in. in diameter. Tail and nose are conical sections. Four ammonia fuel wings are mounted at about the 50% point of the body length. Four cruciform movable sections are mounted at the tail and in the same places on the wings.

Each of these eight sections is machined out of a solid chunk of metal (most likely an aluminum alloy). Cross-section profile is a modified (flattened) double wedge, with the flattened portion increasing from root to tip section. In planform the wing sections are of constant chord; all surfaces are tapered in thickness.

Launching of the vehicle is by means of a pneumatic booster. Propellants for the rocket motor were not specified.

Tracking equipment is carried in the vehicle.

■ Plastic Delta—Another very interesting exhibit was a full-scale delta wing model milled from a plastic material.



RAE RESEARCH ROCKET shows four fuel wings and four movable tail sections.

It was built to test a construction technique which combined an internal structure and a molded outer skin. The skin was molded with the complete wing, but in such a way that it could be separated for bolting of the internal structure. After bolting, the outer skin was placed into position and polished to a high gloss.

The molded material is quite porous, but can be finished with filling compounds which make the plastic equivalent to metal.

The wing material is claimed to have good heat and sound absorbing properties, without any further addition of base paint. It would certainly meet that fractional heating, even at low supersonic speeds, would sustain thermally reacting plasmas to the point where they would flow under load.

One other advantage of a plastic structure is that repairs can be located completely within the contour, eliminating the drag associated with local protrusions.

The regression of stresses in many current high-speed aircraft is another glow in approximately this way, by molding a plastic lining or cap around the metallic structure.

Another different method for tape-pulling systems is to use the entire surface as an actuator. A coil is placed near the wing root, for example, and across the wing and fuselage. The exhibit showed one scheme for using the method for a communications antenna in the 2-20 megacycle band. Associated with the coil is a movable control system which turns and rotates coils for any one of twelve pre-selected frequencies.

■ Transducers—The Ministry of Supply demonstrated two types of transducer transducers converting physical quantities to electrical ones which can be used to measure a wide variety of conditions. The transducers on display were designed to measure pressure, heat and angular orientation and angle of attack.

Both types—non-reductive and the other reductive—are used to modulate the vibratory frequency of a piezoelectric transducer.

■ Inductance type utilizes the air gap between a coil and an inductor, the inductor being the moving part. Its response is in proportion to the quarter-hertz measured.

■ Resistance type consists by means of a Bonded wire. When the tube de-

APPLICATIONS OF SILICONE RUBBER



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IT'S SILICONE PARTS BY KIRK HILL**

Kidwell Rubber is an experienced fabricator of **Silicone materials**. Our engineers and production men are constantly working with applications in this highly specialized field.

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► Accelerometer-EAE has developed a combining accelerometer which is used to record gust data in flight. It records the number of times each of a series of gusts in a given direction is exceeded during flight.

Sensing element of the accelerometer is a razor wire and spring coupled to a rotary switch by a secondary spring. Damping proportional to the angular velocity of the rotary switch is produced by magnetic eddy currents set up in a hollow aluminum cylinder.

The rotary switch drives a pointer which operates a series of ratchet wheels connected to cylinder-type counters. These counters read in steps of 0.01G up to 1G and in 0.01G-steps from 1G to 3G.

The accelerometer does not count frequencies above about 10 cps, but will record superimposed frequencies of a lower value.

► **Transonic Tests**—One section of the exhibit consisted of a presentation on five-flight transonic measurements made by the rocket boosted model technique. This method has been highly developed by our NACA is repeated flights at Wallops Island; the British activity did not seem to have anything new to offer.

Typical quantities measured in flight by the BAK include drag, induced or flow, inlet drag and efficiency, control and stability parameters, and pressure distribution.

A simple demonstration of the combustibility of high-alkali soda was given by the National Gas Turbine Establishment. Its display showed two identical gas burners in operation. One of the burners was used as the standard of comparison, and burned under normal conditions at atmospheric pressure. The other burned under pressure, which was slowly induced from atmosphere. The quality of combustion decreased, of course, until the flame went out completely at a low pressure value.

The Telecommunications Research Establishment showed a step-by-step exhibit of the manufacture of a 4-tube, 18-component potted circuit.

This is a small nest, with parts (except tubes) imbedded in moss. Once buried, these parts are not removable, and the nest has to be built cheaply enough to throw away.

One difference from American practice is that the tubes are not lapped, but left exposed. This enables replacement in the event of failure and keeps the internal temperature of the block low.

A collection of measurement equipment used in various classes of sewage equipment also was shown. This included transformers, capacitors, switches and sensors deployed in a computerized form. The use of remote analysis



Guardians of the High Seas

Today's modern planes like the Grumman Guardian require structural components that provide maximum strength with minimum weight. And, like other U. S. plane manufacturers, Grumman meets these vital requirements with OSTICO Aircraft Tubing.

For OS/UCO Tubing provides inherent strength without weight characteristics while meeting the most exacting Army, Navy, and AMS specifications. In addition, it is a versatile material - easily formed, machined, and fabricated - ideal for a vast array of aircraft applications including:

fuel lines, engine mounts, and landing gear.

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Manufacturing and Technology of Bamboo and Electric Walled Lead Tubing
Akari and General Office, 1978, 2000

[illegible]

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when freight
flies high



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- Stable at operating temperatures.
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to replace tubes was noted in this collection.

► **Organization**—British government sponsored aeronautical research is a responsibility of the Ministry of Supply, which also is charged with the development of aircraft for the military services and the various corporations. In addition, MoS also is responsible for the supply of all aircraft for the services.

Under the Ministry are eight organizations in specialist fields which carry on the lion's share of MoS research.

► **Royal Aircraft Establishment.** Duties of RAE are very general, they encompass solving the industry on all technical problems concerning the aircraft and with the equipment needed, to make the airplane fly, light and find its way. Guided missiles and air armament work also is done by RAE.

► **National Gas Turbine Establishment.** This organization absorbed Power Jets Ltd. and the RAE's Powerjet Laboratory. Its duties, generally, are to increase the knowledge of gas turbines in all applications. Five departments of the NGLT specialize in aerodynamics, combustion, performance and projects, testing, and test.

► **Telecommunications Research Establishment.** At the same institution, this group does aerial research for the services and the Ministry of Civil Aviation. Four technical departments are concerned with radio, physics, engineering and aircraft.

► **Aircraft and Armament Experimental Establishment.** This and does the flight tests of all prototype aircraft, military and civil. In addition, flight investigations of system-oriented, group, model, engine—come under this group.

► **Aircraft Experimental Division.** Development work on aircraft and associated equipment for release tests is done here. This includes transport aircraft, gliders, and parashutes for cargo and personnel. This unit also does test and experimental work on rotary wing craft.

► **National Aeronautical Research Establishment.** This is the latest home of legendary test facilities for aerodynamic and structural work. Now under construction, the NARE will have large subsonic and supersonic windtunnels.

► **Naval Aircraft Experimental Establishment.** This unit conducts aerodynamic and hydrodynamic research on all water-borne aircraft and conducts performance tests of seaplanes for military and civil use. Marine and air-sea rescue equipment also is the responsibility of this establishment.

► **Aeronautical Inspection Directorate.** Major concern of this group are in the development of methods of inspection and test, maintenance of rigorous standards and provision of test facilities.

► **Engine Test Plant School.** This



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most, based at RAE Farnborough, have had orders for the research, the SRAU, and Composites and Design departments.

Three of these organizations—RAE, NQTE and TRUE—contributed exhibits to the Ministry's stand at Farnborough. • Composites—showing that what was shown on the stand at Farnborough was an representative of British government research in what we show is representative of NACA research, we are definitely ahead of the British.

They are just beginning to build structural and structural elements which compare with NACA facilities.

So the generally accepted view that the British have concentrated on research and development to the exclusion of production is not valid. Indeed, the British have a small research effort compared to U. S. standards, and in about the same proportion that their production compares to ours.

But though small, it is a painstaking effort with a great amount of theoretical calculations backing up, supplementing and often replacing the limited test data. As always, there are not sufficient of value. In research, quality is as important in quantity. And British research, following the pattern of their aircraft designs, is of high quality.

Boeing Personnel Keeps Up-to-Date

Boeing is keeping its design and production personnel's attention on latest manufacturing procedures with display boards and by sheets.

The display boards—consulted through the various plant areas—give simple plans carrying early readable design and fabrication hints. Positioned in a corner of the board are the top sheets which describe in greater detail the procedures and problems involved.

Subjects covered span a wide range—dimension, bearing, fitting, sealing, fasteners, bearing relations, installation, etc.

As an example of the detail the top sheets afford, the discussion on sealing points up the importance of the procedure and the necessity for precise and clear instructions. This is followed by design "do's" and "don'ts" and specific applications of the various types of sealant.

Another top sheet on fit-locks covers sheet metal. Lockitch compares these units with the A-N lock and cover sheet and tensile strength, welded cost, weight, maneuverability, accessibility, and speed of installation. An illustration shows the construction comparisons. Design rules for the card and Lockitch are detailed, hole fits are explained and installation problems described and illustrated.

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OUTPUT:	1500 Volts D.C. to Igniter Plugs
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IGNITION COMPLETE SYSTEM:	4.5 lbs. Average

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FLIGHT view of Avrocar B4 shows cargo area in fuselage-pod fairings. (Continued)



REAR-DOOR loading which gives it ability in amphibious, night or passenger plane.

Baby Boxcar Details Revealed

- Britain's new ambulance-freighter lightplane has rear-door loading in pod-and-boom fuselage
- Primarily designed for use in advanced military areas, Avrocar's B4 is rated in 100 mph. plus class.

Britain's Avrocar B4 ambulance-freighter, a baby freight boxcar, designed for rear door loading. The craft is basically the civil 4-place Avrocar—under its appearance is our Post-Tech-Avros-Avros—plus—with the standard fuselage replaced by a pod-and-boom layout.

The B4 made its first public appearance at the Farnborough display of the SLMAC this year, and has been there since on test with the British army during recent maneuvers.

Primary advantages claimed by Avrocar

for the type is the rear loading door, which makes the aircraft a versatile performer. Although obviously suited to military applications in forward areas, the B4 is suggested in the manner to many problems of civil operations.

►Metal and Fabric: The structure of the B4 follows the general Avrocar pattern of steel tube framework, with fabric covering. The wing areas sport solid and the nose loading door are made of wood. Many of the components are interchangeable with those of the standard Avrocar so that spare parts



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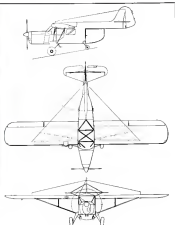
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Payload for max. range 1,000 lbs. max. 500 lbs.
Max. range 1,000 miles max. 500 miles
Takeoff speed 100 mph max. 100 mph
Cruising speed 100 mph max. 100 mph
Rate of climb 1,000 ft. per min. max. 1,000 ft. per min.

stocking can be kept at a minimum.

Engine on the prototype is a Cirrus Bombardier 702 of 150 hp. which is fitted with a carburetor system. A study has been made of the performance of the B4 with a Continental E-150 engine which has 10 more hp. than the British engine. The performance figures are exposed somewhat with this alternate modification.

Landing gear is a four-wheeled arrangement. The main wheels are larger than those of previous models in the Auster line, and have hydraulic brakes and shock absorbers. The cushion tire wheels have dampers and bungee cord shock absorbers.

Wing and tail are covered with fabric,

apex being similar to the civil Austers. Each wing has a fuel tank in the air board section.

►Quick-Change Arms—At the bottom of the B-4's fuselage change is a special lightweight door behind the pilot's seat. Six bolts hold it to the structure, and these bolts can be removed rapidly. Alternate floors with specialized equipment attached can be fitted in place and removed rapidly.

As an ambulance, a single- or double-berth stretchy gear is bolted to the right side of the floor. An stretcher's seat is placed behind the pilot. The stretcher case is loaded through the rear door onto these girders.

As a fighter, the B4's floor is



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closed except for the pilot's seat. The seating cage volume is 110 cu. ft. with a usable length of 13 ft. when the loading door is lifted.

By removing the door, height heights of cargo can be limited, if they are severely limited and C. G. loads are important.

Handling characteristics of the B4 are not noticeably changed with the door removed, and there is no draft or deceleration for the pilot when the door is off.

Sample freight loads quoted by Austin include:
• Blood plasma for 30 men.
• 11 miles of field telephone cable.
• 80 rifles.
• 10,000 lbs. of ammunition.
• One day's field ration for 120 men.

Paratrooper-carrying arrangement over these areas built in the floor. One is next to the pilot and two are on a special rebound off of the pilot. In a pinch, these can sit on the fore seat with.

Wingspan of the B4 is 17 ft., length is 14 ft. 8 in., and max. gross weight is 2,600 lb. The craft is built by Auster Aircraft Ltd., Reading, London, Eng. land.

Duplicator Traces

14 Jet Blades

A. V. Roe Canada, Ltd., is using the fabrication of its Canada jet with a battery of duplicating machines for turbine and compressor blades. Each 14-jet engine duplicator, which was designed by Avro and Modern Tool Works Ltd. (London), traces the contour of a master blade from an 14 workpiece simultaneously.

The master system, held, carrying the blades and 14 spindles, push on bearings at either end by hydraulic cylinder action. Spindles are driven from a common shaft by 14-40:1 gear speed gear, and can be removed for servicing.

Master blade and blade blanks are held by a special fixture on the work table under the spindle head. As the spindle head moves down toward the work, the spindles engage the master blade.

And while the head continues to rise or travel the worktable is adjusted to add from the end, under the control of the hydraulic tracer, maintaining the desired form.

After each cutting stroke, the spindle head moves clear and the table automatically advances longitudinally at a preselected feed rate for the next stroke. An electro-hydraulic control system makes the advancing cycle automatic. Accuracy and fine surface finish, too,



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Avia, reduce further finishing operations to a minimum.

The company reports that operational experience to date indicates that the machine has cut an idle output time to approximately one-quarter. With an unpowered type cutter, it is expected number of cuts will be reduced by further production boost.

Measuring Clearance Of Rotating Shafts

Measuring clearances between rotating shafts and bearings is a rather difficult operation—but a new method developed by M. L. Greenough and associates of the National Bureau of Standards for the Navy's Bureau of Ship Approval to offer a satisfactory solution.

The new proposal utilizes a noncontact-type of electrical distance measuring equipment. The variation of the distance of the rotating shaft from two small fixed coils results in a readily measurable variation in the coupling between the coils.

Special Problem—The gauge was developed for a specific problem which called for measuring the film thickness in a 6-in. bearing with a radial clearance of about 0.006 in. (Radial clearance is the difference between the radii of shaft and bearing).

Anticipated rotational speeds were above 10,000 rpm; therefore the gauge was designed to make no physical contact with the shaft.

Another requirement was that the gauge had to operate in lubricating oil at a temperature of 100°F.

They considered variations of the device have been developed. The models differ in type and number of probes used, in sensitivity, in suitability for measuring vibratory conditions, and type of silencing device.

One model uses a cathodolum tube to provide continuous display of shaft displacement; other models give distance measurements on a dial or meter.

► Two Probes—Two types of probes are used—one at audio frequency and the other at radio frequency. Each probe consists of a pair of small coils—primary and secondary—mounted close to each other and close to, but not touching, the shaft surface.

Each type of probe has advantages and limitations. For maximum sensitivity, the radio probe is recommended.

All other probes, however, make it possible to observe high frequency shaft vibration, an adaptation not possible with the low-frequency inductance probes. The air-core method also is more easily basic, i.e., the input-output ratio is more closely proportional to distance.

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T.P.M. valves, coated on the head and face with another Thompson-developed alloy and with porous stone to promote faster wearing surfaces, are standard equipment in the Pratt & Whitney Aircraft R-4360 and R-2800 Engines.



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tyard as a plate rather than as a beam. The application of this method is presented for specific problems involving static deflection, vibration, and buckling.

In the static-deflection problems, taper and swing are considered.

► An Investigation of the Effects of Jet-Outlet Cut-off Angle on Thrust Reversal and Body Pitching Moment (TN 2170)—by James R. Blaskovich.

The use of a beveled jet exhaust nozzle is often suggested by the fan-lags built-in installation of turbojet engines.

It was felt that these beveled nozzles (or possibly external surfaces around these outlets) might affect the direction of the thrust vector of the jet exhaust from the engine. Any deflection of the exhaust would result in a pitching moment on the body.

Revealing the outlet at such as 75 deg. from normal produced only a slight change in pitching moment on the body. This change probably was caused by external loads on the nozzles.

► Three-Dimensional Control: Left Problem in Helicopter Flight—the Transputer Wing (TN 2385)—by Harold Lorenz, Max A. Haeberle, and Frederick B. Folke.

The purpose of this report is to determine the aerodynamic characteristics of a transputer wing in steady impinging motion. Lift and pitching moment coefficients are derived for flat plate transputer wings. The coefficients are determined for angle of attack distributions corresponding to rolling wings and to pitching wings. A complete analysis is presented for a wing with upstream edges; a partial analysis is presented for the case of downstream edges.

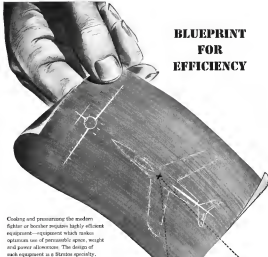
—DAA

NYU Frosh Pick Aero Engineering

Accomplished engineering in the top class among the current freshmen class of New York University's College of Engineering, according to Dean Theodore Saelens. And in spite of the national trend of decreased college enrollment, NYU has the most number of frosh this year in the field.

Dean Saelens also said that there is more in prospect a larger enrollment in the College of Engineering next year, judging on the basis of the number of inquiries received from high schools.

The number of admissions in the graduate school is up by nearly 75% over last year's, but the total enrollment has declined by about the same amount, as a general agreement with the predicted national figure of 10%.



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New Speedy Test of Material Endurance

A completely new approach has been made to the determination of endurance limits of materials by two polygraph predictions and their discovery promises to save months of testing time.

The new technique—which resulted from studies of stresses on rocks and materials now devised by Dr. Jauch L. Rosenbly, head of geology at Research Polytechnic Institute, and Prof. Dudley T. Smith, his chief associate here of their discovery is the fact that metals, when heated to moderate temperatures, show lower rates of expansion which vary with the amount of pre-stressing. And it is a corollary, a rapid change in the rate of expansion occurs at the endurance limit of the pre-stressed material.

Long Testing—Usual method of determining endurance limit of any material involves vibrating specimen under load. The procedure continues until either the specimen fails or a predetermined life is reached.

It may take months to complete such tests, because pressure causing parts in machines may undergo hundreds of millions of cycles during their useful life. And first life has to be duplicated in endurance-limit testing.

The R/S Dilatram method uses a test specimen machined from a bar six or long and 1 in. in dia. The central two inches of the bar is machined down to a 7/16 in. diameter.

The next step is to find the yield point of the test specimen by pulling one sample in the usual way.

Eight test specimens are then stressed over a range of values which brackets the yield point stress. These pre-stresses are in 5,000 psi steps.

All eight test pieces are vibrated for 169,900 cycles, which puts them on a common fatigue level. An underwater pig (to keep the pieces cool and eliminate any machining stresses) is used to slice off the ends of each bar to leave the central section in the shape of a spool.

A bank of eight Dilatram multiplexers is used to hold the test specimens. Each multiplexer has a quartz tube 30 in. long which contains a quartz rod. One end of the rod rests against the end of the test specimen and the other bears against a steel lever. Each of the multiplexers is connected in series at both of their terminals.

Growth Measured—The rate both pre-stress is raised gradually to 7,112 psi and the expansion of the test piece is measured by the quartz rod in the steel lever. Movement of the lever is recorded automatically with a 1,500-cps magnifying device.

It takes about two hours to record the total expansion of the pieces. The

lowest values of growth are plotted against a pre-stress value.

A sharp dip in the plotted curve results at the endurance limit of the material. And the dip is so clearly defined that the calculations least squares can be easily pulled off the curve.

So far the Dilatram method has been checked with samples of dural, magnesium, steel, brass, polyethylene, and cast aluminum and hard steel.

Rosenbly and Smith are currently working on an adaptation of the method which will permit testing at very high temperatures. This work is expected to be of great value in the gas-turbine industry.

How Sharp Turns Kill Deefbels

Another answer to the question of how to soundproof engine test cells was recently described by Dr. Howard G. Herby, who heads research on vibration and vibration for American Research Foundation of Illinois Institute of Technology.

Dr. Herby, speaking before the Acoustical Society of America, said that the Foundation developed a structure which channels sound through a series of 160 deg. turns. Lifting most of the intensity at every turn.

For Parts that must be TAKEN OFF—PUT BACK—BUTTONED TIGHT LION FASTENERS



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2 New Waveguide Instruments Offered

Hewlett-Packard Co. announces two new instruments for waveguide measurement—the hp-7755A Waveform Power Supply and the hp-455D Detector Meter.

The power supply is designed for test bench operation of all types of low power Klystron oscillators. It provides a beam voltage which is continuously variable from 150 to 400 v at 75 milliwatts. Reflector voltage is variable from 10 to 100 v at 5 milliwatts. Square wave modulation at 1,000 cps is provided. Filament supply is 5.3 v at 1.5 amps.

The power supply is mounted in a steel case with carrying handle. Price of the unit is \$100 in bulk quantity.

The detector meter is intended to facilitate the measurement of power at six frequencies—2 to 100 mc—in conjunction with the hp-450A Power Meter and a Sperry R21 klystron. It may also be used to detect if energy or to measure the return loss using a Type 1N23 silicon crystal.

Mounts are available in various sizes, price range from \$75 to \$125, each, factory.

Further information can be obtained from Hewlett-Packard Co., 195 Page Mill Road, Palo Alto, Calif.

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New Potentiometer Has Tandem Units

Charstar's Series 43A potentiometer has been further refined recently, and is now being offered in tandem assemblies made to order.

The pot—which is an essential part of electronic computing equipment—is enclosed in a circular 2 1/2-in. diameter housing which locks together with similar units. The tandem assembly is held together by metal endplates and threaded screws. A camshaft slips through the tandem assembly, and the control arm of each unit can be adjusted readily

to synchronize with reference to the common shaft or with other control arms.

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For these windings, the resistance range is from 390 to 390,000 ohms. Tapered windings also are available. Linear controls are rated at 3 watts, but the rating of tapered controls depends on the type of taper. Standard controls

provide tolerance in plus or minus 5%. Ratio of voltage at any point on the pot to total impressed voltage can be either 85% of the theoretically exact value.

For further information, write the Charstar Mfg. Co., Inc., Downs, New Hampshire.

New Miniature Selenium Unit

A new line of miniature electronic selenium rectifiers is being offered by Electronic Devices, Inc., Phoenix. Rectifier line, 420 12th St., Phoenix, N. Y.

Up to a rating of 200 ma. d.c. output, the Flatsteel rectifiers are all molded construction similar to tubular construction. The units are in special round phenolic case which is not, but at 100° C. Thermal conductivity of this case and the low loss plate design of the rectifier compensate for loss of cooling due to welding.

In ratings from 250 ma. d.c. to 500 ma. d.c., standard open-plate construction is used.

All open and closed construction units are standard in 180 P.I.U. ratings, their use can be limited in other voltage ratings and as doubler units for special applications. Rectifiers are guaranteed for 1,000 hr. at 1 volt, whichever comes first.

These rectifiers are manufactured with back or isolated tie-copper leads.

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GE's X-Ray Dept. is located at 4055
Electric Ave., Milwaukee, WI

A new, direct-coupled amplifier designed for use in the standard 19-in rack, is available from the Brook Development Co.

The instrument, designated Model HL-962 by the manufacturer, was designed for use with Brush magnetic direct writing oscillographs in studies of static and dynamic conditions. Among these might be measurements of strains, displacements, pressures, light intensity, temperature and a.c. or d.c. voltages and currents.

Voltage gain is about 1,000 times sufficient to put 1 mm deflection on the oscillograph chart per millivolt input. Plate and heater voltage regulation are combined with "noval design features" to minimize effects of power line fluctuations. Zero signal drift is claimed to be not more than one chart millimeter per hour. When the amplifier is used with the penmeter, the frequency response is essentially flat from d.c. to 100 mc.

Control panel mounts in atmosphere with five factor-of-ten position, gain control, attenuating meter and input voltage controls. A balancing potentiometer is provided for eliminating oscillograph pen to any position on the chart. Front panel and chassis carry live input pins and output sockets.

For detailed description, write The Fresh Development Co., Instrument Division 3, 1405 Prufert Ave., Cleveland 14, Ohio.

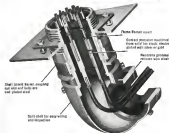
An electronic stethoscope for locating friction noises in bearings and other mechanisms is being offered by Axi Instruments Inc., 4254 W. Arlington St., Chgo 24.

The gadget, named ElecDeter, uses a metal probe as a microphone; incoming noise is heard as cymatics.

The manufacturer says that the device can detect sounds at low speeds ranging that would otherwise be heard only at high speed. Airborne sounds do not correct.

The seat is furnished with high-resistance upholstery, batteries and leather covering over

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PLUGS**



Hans is another example of the crew. Cannon Electric takes on developing a computer for specialized use. This is the Firewall Computer to prevent the spread of a possible aircraft engine fire through the bulkhead into wing sections.

Illustration shows Flame Barrier type with phenolic insert and contains having solder cups. Shell must resist an operating of 1000° F for 28 minutes. Electric circuits not required to remain serviceable.

The Fingerproof continuous service type is similar in appearance, but has a clamp-type contacts in fingerproof insert material. Must carry rated DC current under open flame of 3850° F for five minutes and withstand vibration of 1" double amplitude at 2000 cycles per minute. Designed for aircraft, this connector has other applications where the going is tough. For further information request Cannon Aircraft Firewall Bulletin.



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Will Defense Production Be Caught in the Squeeze?

When Congress revised and extended the Defense Production Act, it relaxed a squeeze on business profits.

President Truman asserted that this action by Congress cripples the government in its effort to prevent inflation which, as he puts it, could lead to "enormous and profligate for the few, economic hardship and misery for the many."

He asked Congress to restrain its action.

This editorial—the second on problems presented by "escalator" clauses—aims to throw some light on this conflict of opinion.

The Squeeze

The squeeze on profits was imposed in the name of price stabilization. The idea behind it was simple. The selling prices of industrial products were to be held under a tight lid. But many industrial costs are affected by "escalator" clauses of one kind or another which tend to boost production costs. Thus, with rising costs and fixed prices, profits would be squeezed and much of the cost of defense would thereby be shifted from those favored by escalator clauses to business concerns.

The mechanics of this squeeze on profits were complicated. But here, in brief, is how it was to work. The first step was to require manufacturers to set ceiling prices, effective May 28, for their products.

These ceiling or maximum prices were to allow for increases in manufacturers' costs that had occurred since Korea. But they did not allow for all increases. Manufacturers, for example, could not include increases in indirect costs—office or selling costs. Neither could they, in calculating their new prices, include increases in the costs of materials or direct labor that had come after March 15. This was the first phase of the squeeze on profits.

The second phase was prepared by not putting a ceiling on costs. The Wage Stabilization Board said it could not disturb the operation of "escalator" clauses by which wage rates are geared to the cost of living. Moreover, nothing could be done to curb the operation of the farmers' "escalator" clause, the farm parity arrangement. Under it, the federal government underwrites higher prices for farm products to match increases in the cost of things farmers buy. So this left wages and many materials costs free to rise against a ceiling imposed on the prices of what industry has to sell.

Relief—or a Loss

On two conditions only would the Office of Price Stabilization permit a company to raise its prices and escape this squeeze. One of these was that increased costs had more than wiped out its profits; in other words, that it was operating at a loss. The other condition was

that the industry of which the company is a part was not, as a whole, making "excess profits." That is, the industry, as a whole, could not get price relief if its overall profits before taxes were greater than 85 percent of its average profits during the best three of the four years from 1946 through 1949. Many companies expected that their profits would be cut drastically before they could get through this narrow escape hatch.

When this squeeze on profits was set up, we were told that industry as a whole was reporting record profits. But, it was equally true that wage rates and farm prices also were at record high levels. And it was also true that, under the impact of rising taxes and the dislocations caused by the defense mobilization program, profits actually were on the way down.

Profits—Going Down

By the time Congress acted to relax the squeeze, corporate profits, after taxes, were running at a rate 20 percent lower than they had been six months before. And the clear prospect was that they would continue to decline.

So the issue put up to Congress was simply this: Should business firms stand so much of the brunt of the defense costs while "escalator" clauses continued to exempt organized workers and farmers from paying their share of those costs?

But this question actually is much broader than one of fairness or unfairness alone. One certain effect of such a squeeze on profits would be to undercut the capacity of private industry to install the new plants and equipment needed for our mobilization effort. Today—unlike World War II—private industry is financing almost all of our huge program to expand production. And about two-thirds of the money that has been plowed into the expansion and improvement of our industrial machine since World War II has come out of profits.

In view of all this, Congress decided last summer to relax the pressure on profits. This was done by the controversial Capshart Amendment to the Defense Production Act. This amendment has serious administrative weaknesses. But some measure with the same purpose is needed to maintain profits at a high enough level to finance the huge and continuing expansion of our industrial machine that is now underway.

Basic Issues

As soon as the amendment was enacted, the President asked Congress to revise the law again. The heart of his proposal was to restore to the Administration the powers it used last spring to arrange the squeeze on profits outlined here.

This controversy will continue. There can be no final answer to it as long as we have the economic controls made necessary by mobilization.

But if we look beneath the surface of this technically complicated controversy, we shall see clearly that the basic issues are:

1. Whether we really shall make an effort to distribute fairly the burdens of inflation caused by our defense mobilization—

2. Whether farmers and organized workers should be exempted from these sacrifices by escalator clauses—at the expense of the nation as a whole—

3. Whether profits should be squeezed still more—at the risk of putting a fatal squeeze on the effort of industry to build new plants and install new tools. These new facilities are essential to maintaining American living standards—and they are the heart of our ability to defend ourselves and the rest of the free world.

Americans face no more important economic issues at this time.

McGraw-Hill Publishing Company, Inc.



SURPLUS: \$100,000-\$500 million worth of down-on-all-cylinders in USAF depots at Marietta and Omaha, where they can be inspected by defense contractors and subcontractors. Available are about 5,000 gear and grinding machines, welding and other equipment.

AF Still Has Surplus Tools—But Hurry

• USAF wants depots back in production picture.

• So stored machines must be out by year's end.

Marine tool-lugger USAF press and subcontractors have pretty well cleaned out the huge Marietta, Ga., and Omaha, Neb., surplus machinery depots.

What's left has been refused to Army and Navy contractors—and it isn't much, to hear them tell it. But that it can't be remembered that the Air Force has been awaking through the two former World War II plants for months and finally passed up anything they thought they could use, either as new or with some modification.

► **Press Out**—The process, naturally, is being pushed by most changes in USAF policy which allowed qualified firms to make on-the-spot selections, has cleared out of the depots all but about 5,000 gear and grinding machines, welding and miscellaneous equipment valued at about \$50 million.

Air Force wants the remainder out of the way by year's end so that the World War II-built plants can be put



BRIEFING: A given contractor before they are turned loose to depot.

back into defense production. Lockheed will put the Marietta facility to work making B-26s at first, later will build F-47 Strikings; however, the Omaha plant is slated for an aviation-industrial production program.

► **'Gold Mine'**—Despite early reports of "obsolescence," there is good evidence that the depots have proved a "gold mine" for the aviation industry.

Wright Aeronautical Corp.'s experiences bear this out. The big East Coast engine maker has purchased more 2,000 valuable tools during its marches through both facilities—most of which required little more than cleaning prior to operation.

On its last excursion, several weeks back, WAC picked up 107 machines for itself, in addition to supplying



REPRESENTATIVES from Bell and Solar check how well world fit in their plant.



ASSORTMENT OF GRINDERS offers many leads for manufacturers' inspection teams.

selections for some of its subcontractors.

► **Many Types**—It values its acquisitions at from one to \$1.5 million. They include such machines as external and cylindrical grinders, automatic lathes, gear hobs, Millwrights, thread mills, and apparatus such as chain hoists, electric hoists, trucks, Magnetics equipment, spare electrical motors and the like.

Wright didn't get everything it wanted—catalytic converters and some of the machines that WAC selected were awarded to other firms with higher AF priority. At Marietta, Wright got 52 out of 107 tools selected by its inspection team; the score at Omaha was 53 out of 115.

Wright appears pleased with its



insulates this hot job!

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requirements from the depot—and these are so waiting for delivery.

In purchasing new equipment, the company must be satisfied with pressure of deliveries only in "cash" in December 1952.

Consolidating firms, too, have been searching through the stacks at the two depots, as have the Atomic Energy Commission and other government agencies.

►Closed Out-So it's undeniably why the 315 representatives of Army and Navy firms who tested the installations recently under the new "open-house" policy might have found less package.

Some confusion and red tape only added more aggravation. As Force visited the tools cleaned and the Army-Navy representatives suddenly left but they lacked the authority to clear selection.

DPA's machine tool consultant Ed Hunt added to the confusion by announcing that Defense Production Administration and the Joint Central Inventory Group would not approve some of the equipment getting the tools since a large number of these were down in the third and fourth tier of sub contracting and had no low priorities to get on list.

The protection forces didn't represent "top brass" and hesitated to go out on a limb in opposing some of the selections.

But finally about 500 tools were tagged for shipment.

What because of the remaining tools? They will either be picked up by firm who takes the time to go down and see if there's anything that they need—or they'll be stored outside the plant.

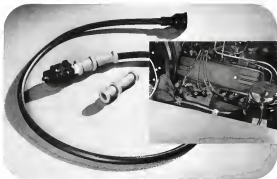
►How to Do It—Detailed listings of the remaining tools may be obtained from the Production Equipment Joint Control Inventory Group, Old Post Office Building, Washington, D. C.

Contractors and sub should submit arrangements for their ways to the depots through the branch of the company for which they are producing, with USAF contractors processing their requests through the nearest AF regional office.

The tools are leased by the responsible branch to the contractor at a fixed monthly cost.

Reoccupies Plant

Glass L. Mott Co. has begun construction of the government-owned \$4,475,375 ft. plant which will be the company during World War II for B-36 bomber production. About 3,000 persons are now employed in the plant, located on Martin Airport, Ballymore, Md.



SILASTIC* boots plug ignition leaks!

It's no longer a trade-secret that some of the leading automobile manufacturers are using Silastic boots to plug ignition leaks. Molded of Silastic 250, these spark plug boots exclude moisture; remain flexible for an indefinitely long period of time at sub-zero temperatures and at operating temperatures in the range of 600° - 450°F. They withstand hot oil and they keep a spark at 27,000 to 40,000 volts from jumping over the outside of the plug. These are the properties of Silastic that

make engines easy to start even on a wet morning. And these are the properties that start engineers to work simplifying the design and increasing the service life of hot air shut-off valves, transmission systems, cooling fans on aircraft engines, anti-icing systems, traction motors, transformers and cable. You can do extraordinary things with Silastic, the Dow Corning silicone rubber that retains its properties over a temperature span of more than 600 degrees from -100° to +500°F.

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Special Tool Speeds Metal Cutting Study

A specially equipped lathe designed to speed the study of metal cutting problems has been developed by the Moss and Michels Tool Co. of Selma, Ala.

The lathe recently was used in a six-month project aimed at bringing about improvements in the machinability of various metals—particularly new high-temperature alloys. The project was carried out by Cannon-Wright Corp., under contract with the Air Force. Other participants were the Ford Motor Co., Massachusetts Institute of Technology and Metallurgical Research Association of Cincinnati.

The lathe simplified a wide variety of speeds and feeds required in making the tests. As Michels explains it, the machine supplies the "fundamental relationship" between a moving workpiece and a fixed, stationary, single-point tool. In many of the experiments for automated machinability testing, including one priority in instrumentation, feasibility of operation and a maximum comprehension of testing time and accuracy.

Basically a 13 x 45 in. Moss Metal lathe, the lathe's normal spindle speed of 150 to 1000 rpm was stepped up to 6000 rpm through special gearing and the use of a 20-hp variable-speed drive. For tests, several tachometers are mounted on top of the lathe headstock to permit selection and monitoring by the operator of the exact surface speed required. To measure both cutting and thrust forces created by boring operations during tests, the lathe is equipped with a mechanical, two-component dynamometer attached to the cross slide.

OUR EXPANDING INDUSTRY

Engler Steel Service Co. has established its specialty steel service at Wichita, Kan. Company also has plants at Los Angeles and Oakland, Calif.

Fincham Photo Glass Co. has introduced a clear glass disk and will manufacture standard and special size glass under license agreement with Owens-Corning Fiberglas Corp.

Kubler Rubber Co. has moved into its new office and factory at Bay, Calif. Company is rubber mill supplier. New plant will have 200,000 sq. ft. when completed.

Twice has awarded a contract for additional construction at its new Major Field overland base at Compton (Continued on p. 57)

SAVE TIME CONNECTING THERMOCOUPLE CIRCUITS with QUICK COUPLING CONNECTOR PANELS



Fig. 1004
Panel for 30 Thermocouples
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A rapid and flexible method for connecting numerous thermocouples to pyrometers—regardless of their location. One central point for wiring and breaking circuits.

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Tactical Airlift- Pratt & Whitney Powered!

**U. S. Air Force's Combat Cargo Command in Korea
Hits New Marks in Air Support of Ground Troops**

From the outbreak of the Korean War, United Nations strategists were faced with the tremendous problem of transporting troops and supplies to hastily organized bases thousands of miles from home.

To help meet this emergency, military planners drew on their experience with previous airlifts, and almost overnight established the Combat Cargo Command of the Far East Air Force. Its mission was to carry troops, evacuate wounded and supply ground forces on a scale never before undertaken.

Men and planes were drawn from Air Force units, the U. S. Marine Corps and the Royal Australian Air Force. The aircraft were Curtiss C-46s, Douglas C-47s and C-54s, and Fairchild C-119 Prefects.

The world at large has heard of such Combat Cargo Command feats as the paratroop of over 3,000 troops, jeeps, howitzers, guns and supplies which cut off enemy troops at Pyongyang—the complete supplying for 12 days of 30,000 U. N. forces isolated in the Chosin Reservoir area... the airdrop of a

16-ton bridge that saved millions in supplies... and the rescue of over 4,000 civilians in the Chosin area.

But so much as these accomplishments stand out, it was the steady day-by-day operations which contributed most heavily. In its first 145 days of existence, for instance, the Combat Cargo Command flew 32,851 sorties, airlifted 130,948 tons of cargo, carried 150,397 military passengers, and evacuated by air 73,151 persons.

What the Combat Cargo Command has been doing in Korea is even more remarkable in the face of the limited time that was available for training crews in specialized duties, the crude fields from which aircraft were forced to operate, and the fact that flying was on a 24-hour a day, all-weather basis.

That these obstacles were overcome so successfully is a tribute to the rugged aircraft used to undertake the job, to the skill of the men who manned them, and to the dependable Pratt & Whitney engines which powered them all.

*Pratt & Whitney
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PARKER ALUMINUM and ZINC Die Castings

(Continued from p. 39)
ville, Tex. Company now has a payroll of 750 at Greenville engaged in overhauling C-16s. New buildings are expected to be ready this month.

Fairchild Camera and Instrument Corp. has announced it will build a \$1,000,000 plant at Juncos, Long Island, to 80 delivery orders for aerial cameras, radio direction finders and other equipment for the armed forces.

Chrysler Corp. has received a multi-million-dollar contract for the production of Blazer Standard properties, order license agreements, at its Dodge plant at San Leandro, Calif. A 750,000 sq. ft. addition is under construction at the Dodge facility for the new Navy production job.

Radio Automation Corp.'s Red Bank, N. J., division will double its employment when the new 75,000-sq.-ft. addition now under construction is completed early next year. The new facility will accommodate existing electrical equipment, such as motors, generators, servitors and dynamometers.

Mannesmann-Röntgen Co., Indianapolis, has received an Air Force contract in excess of \$10 million for the production of Model Q10 crash trucks.

AMC Sets Up New Production Sections

Dynas-Air Force has made a number of organizational changes in the production shop at Air National Center

headquarters to place heavier emphasis on production.

The Directorate of Procurement and Production replaces former Directorate of Procurement and Industrial Planning. Major changes in the staff, MCR, and Directorate is headed by Maj. Gen. Mark E. Boudin, Jr.

Directorate component changes include:

- New production division, MCFR, headed by Col. Beverly H. Warren, former chief of Southern Air Procurement District. Division will maintain surveillance over production of material to satisfy AF requirements and will be composed of three sections: Aircraft and Missile Production section, MCFR/A; Assembled Equipment Production section, MCFR/AE; and Material Production section, MCFR/M. Col. Warren's office will be in Building 15, Area B.

Significant locations have not been determined.

- New Production Analysis section, MCFR/PA, to analyze placement of contracts and contract delivery schedules in relation to program requirements, plus forecasting of critical material.

- Set up Requirements and Distribution Control office, MCFR/DC, as staff office within Procurement division. Activities include: 1. Plan, schedule and complete aircraft (except C-119) and C-119 requirements. 2. Direct distribution of C-119, C-119B, C-119C, C-119D, C-119E, C-119F, C-119G, C-119H, C-119I, C-119J, C-119K, C-119L, C-119M, C-119N, C-119O, C-119P, C-119Q, C-119R, C-119S, C-119T, C-119U, C-119V, C-119W, C-119X, C-119Y, C-119Z, C-119AA, C-119AB, C-119AC, C-119AD, C-119AE, C-119AF, C-119AG, C-119AH, C-119AI, C-119AJ, C-119AK, C-119AL, C-119AM, C-119AN, C-119AO, C-119AP, C-119AQ, C-119AR, C-119AS, C-119AT, C-119AU, C-119AV, C-119AW, C-119AX, C-119AY, C-119AZ, C-119BA, C-119BB, C-119BC, C-119BD, C-119BE, C-119BF, C-119BG, C-119BH, C-119BI, C-119BJ, C-119BK, C-119BL, C-119BM, C-119BN, C-119BO, C-119BP, C-119BQ, C-119BR, C-119BS, C-119BT, C-119BU, C-119BV, C-119BW, C-119BX, C-119BY, C-119BZ, C-119CA, C-119CB, C-119CC, C-119CD, C-119CE, C-119CF, C-119CG, C-119CH, C-119CI, C-119CJ, C-119CK, C-119CL, C-119CM, C-119CN, C-119CO, C-119CP, C-119CQ, C-119CR, C-119CS, C-119CT, C-119CU, C-119CV, C-119CW, C-119CX, C-119CY, C-119CZ, C-119DA, C-119DB, C-119DC, C-119DD, C-119DE, C-119DF, C-119DG, 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GE EXPANDS J-47 OVERHAUL SHOP

Latest view of General Electric's Los Angeles aviation service center shows a portion of the J-47 repair and overhaul shop, which also works on aircraft generators, turbochargers, associated components and auxiliary equipment. The firm has spent \$75,000 in improving these facilities on enterprise of a general expansion in GE's various activities, with USAF rigging up one of J-47-powered aircraft in the west. The shop also runs a school for training GE and AF personnel.

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EQUIPMENT

PanAm Building DC-6B Flight Simulator

• Success of Stratocruiser trainer inspires new unit.

• But company has to build this one itself.

By George L. Christian

Pan American World Airways feels that its electronic flight simulator has paid off so well, that the airline is proceeding with the construction of a "cock simulator" for the DC-6Bs it will soon put into operation.

Samuel H. Miller, PanAm's operations manager, Atlantic division, recently authorized the construction of the unit, he told Aviation Week.

PAA purchased the basic portion of a DC-5 into which it will build an accurate replica of all the instruments, controls, switches and gauges of the DC-6B cockpit. The entire system will be designed and assembled by PAA personnel.

Partial Simulation—Miller does not anticipate going to full simulation of all DC-6B functions initially. At first, the only aids to flight will be the airport and standard positive instructions, flight instruments and emergency gear. Stick forces, he believes, will not be duplicated at first. The completed unit, he feels, will be installed, will cost between \$150,000 and \$200,000.

One problem being PAA is obtaining the necessary help and parts from Douglas. Because of this, Miller does not expect the completion of the unit before 12 months.

Miller said that PanAm flight crews, trained with the results obtained from the Delvald Trainer for the Boeing 377, underwrite the company's decision to go ahead with the DC-6B unit.

Training Economy—PanAm figures that if it cut its crew flight training costs by about 60% using its new flight simulator, it would break even.

The more than 200 flight crews who have been trained in the Delvald have had their actual flight training elsewhere, but they have had to fly to and from the simulator, which is located in a PanAm Stratocruiser stands at 5000.

Installed at PAA's LaGuardia Field base, the electronic simulator has not turned in 10,000 hr. of operation since it arrived in November 1948. PanAm engineers estimate that during the 74



STRATOCRUISER simulator at PanAm with "flight conditions" appears behind crew.

years of operation the trainers lost less than 50 hr. for maintenance. This was despite obnoxious periods which ran as high as 24 hr. a day.

Act Right—Current unit of the simulator, according to Paul Pettilo, PAA's chief flight simulator supervisor, is to dull flight crew in as perfect cockpit simulation as possible. Then, everything else, such as procedure, handling technique, physiology, safety precautions, etc., will be done almost automatically. And above all, you achieve a "lost cockpit" in highly desirable at all times but especially during an emergency. Each crew member performs his assigned task with great efficiency, the confusion of uncertainty is eliminated.

Talk Right—The unit-to-be has also paid for itself in standardizing cockpit terminology. A captain's orders to a co-pilot or flight engineer might mean something completely different from the words intended.

One in point was when a captain, seeing that he was badly underpowering his first engine in a simulated flight crisis for "lack of power." The flight engineers thought the captain was being

lateral and took more power, he dropped the throttle. Result—crash.

PanAm immediately established a firm philosophy for a report for more power. "Full power," which could not be interpreted.

Still another point uncovered by the Delvald was gyro horizon failure. While studying the cause for a number of simulator "crashes," PAA officials found away of five attributable to failure of the gyro horizon which were undetected by the pilot while flying under instrument conditions. When brought to the attention of the simulator's maintenance, the latter promptly changed a small warning flag which alerted the crew if the gyro horizon was faulty.

Safe Emergency—The perfection of crew coordination, especially under emergency conditions of fire, engine out, severe icing and the like, can be achieved better with the simulator than with the actual aircraft. PAA's chief maintenance and diagnostic technician—which occasionally craft is a "crash"—can be setup as the simulator than in the plane itself. The motion of the simulator, it is added, complete with



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engine cases, short stopping the wind-ward, control from rimping with no speed, two exhausts with asymmetrical power conditions, etc.

- Complete Course—Fischer has worked up an extensive series of syllabuses to cover every aspect of training for its flight crews. These are some examples:
 - Initial check-out (total of 55 hr.) consists of 16 hours covering up to 30 items per lesson. Sample items are fuel, because, after takeoff at 100 ft., set turbo on fire during run-up, give propeller detent failure while in holding pattern, indicate fire in No. 2 engine, start 2-propellers in area 2 and 1. Initial fire and again in a few minutes. The lessons also include rack routine items in making rack discussion and flying U.S. and GCA approaches and landings.
 - Six months' instructor and check syllabus.
 - Pilot's training at the flight engineer's panel to acquaint the pilot with engineer's duties.
 - Crew accident/ requalification (three given after a violation of one month's duration or longer).

Currently, FAA requires its cockpit flight personnel (including the flight engineer) to take a 13-hour refresher course in the simulator every six months. This is accompanied by one actual flight in the sim.

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Not only has FAA trained flight crew from its Alaska, Latin American and Pacific Alaska divisions, it has also documented flight personnel of French Overseas Airways Corp. and the Military Air Transport Service.

Rain-Proof Plug

Champion Spark Plug is offering a shielded automatic spark plug to the motor industry. Big advantage of the unit the manufacturer feels is that it will end drawing out of engines on many automotive equipment left out in the rain.

Plug is also explosion proof. The shielded unit will be made in all heat ranges, and can be fitted to existing ignition systems without changing bracket, company says.

Leak Detector Spots Gas Contaminants

General Electric Co. says its Type H leak detector, an instrument with a long, thin probe generally used to discover small leaks in pneumatic systems, has started at least one company in searching the fleet for contaminating halogen vapors that have gotten into empty oxygen containers, dangerously



Compressor Powers Gun Charger

The first application of Walbro Kidd's 4-40s, 1,000 psi, air/oil emulsion compressor to a production aircraft has just been announced by that company. Compressor will probably go on the Republic F-84 series.

Technically, Walbro's model 4-40s, 4-stage, piston type compressor is the prime power supply for the Kidd automatic gun charger for the plane's 50 caliber machine gun.

Its output is also used as emergency power for landing gear, flaps, etc., according to company.

Features of the system:

- Dual pressure layout, 1,700 and 1,000 psi. (Note two storage bottles on wheel up board)
- Pneumatic forces to shut off automatically any part of the system which becomes damaged.
- Mechanical moisture separator in series with chemical drier to keep no dr.
- Each compressor is run in for 17 hr., disassembled, inspected and reassembled before shipment, according to the manufacturer. Total weight approximately 15 lb. and measures 11 X 8 X 5 in.

needed or designed as shipment. The unit is by Zep Aero Co., which manufactures and sells oxygen bottles and tanks used in military planes. This firm, says GE, has found the leak detector can safely deep inside the containers and check out the smallest traces of halogen, such as chlorine. The vapor are purged before the bottle is refilled.



Oleo Drag Struts Soften 4-0-4 Landing

Oleo drag struts are the main landing gear set a feature of the new Martin 4-0-4.

Sender in design and intended to prepare to the work on Lockheed Constellation, this is one of the first applications of the device to a medium-size transport. The Martin unit resulted from a Navy development program contract.

The simple lightweight device reduces high "squand" and "spring back" machine loads imposed on the landing gear at touch down. Squand loads are "reduced by approximately one third, spring-back loads are virtually eliminated, and the number of forward landing gear oscillations were virtually reduced," says Martin exp. says.

How it works—The oleo drag strut is built into the vertical shock absorber support linkage.

A steel piston in an aluminum cylinder allows the main gear to spring back, approximately seven in. on landing, resulting in less stress on the structure and more comfort for passengers and crew. Oil in the cylinder is bled through a small orifice in the piston head when forward lift forces are applied to the landing strut.

As in the cylinder supplies the cushioning effect. The unit is completely independent of the aircraft's main hydraulic system and operates at 1,000 psi.



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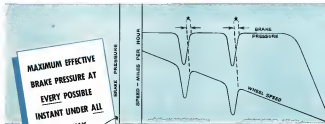
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This diagrammatic sketch shows at a glance the full brake pressure provided by the Decelostat's principle of operation. This full brake pressure is maintained at the wheel at all times. The Decelostat eases this pressure to conform to runway conditions—with full restoration as soon as normal adhesion is re-established.



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PIERCE GOVERNORS



NWA Confirms Order For Sperry Analyzers

Northwest Airlines is proceeding immediately with the installation of Sperry engine engine analyzers in its fleet of 16 Boeing 747-200s. One G. B. Sperry, NWA's manager of engineering, confirmed the story appearing in *Aviation Week* Oct. 4, p. 31.

Order adds up to 15 engine units and one portable instrument. Included in this total is one airborne analyzer originally on consignment to NWA for the last year (performance of which was the basis of the airline's order).

Sperry is making one analyzer to NWA for Nov. 15 so that it may be installed in the plane which carries the Hydrul engine engine on its main wheels. Reason for the rush is that the engine wants the ship with both doors installed and working to use for its survey flight to Tokyo scheduled for early December.

Sperry will deliver the balance of the analyzers on a two-month schedule. NWA, almost committed to purchasing the Sperry instrument two months ago, paused in its decision to evaluate the Sperry analyzers because of its reduced cost. Final decision was to go along with the Sperry unit, however.

Total bill is reported to be \$72,000.

Small Jet Starter

A 350 hp. jet engine starter with enough thrust to wind up Supp's turbine compressor to 1,000 rpm in 34 seconds has been announced by the Engine Power Division, Boeing Aviation Corp.

The starter, the size of an average typewriter, and weighing 75 lb., develops its thrust using a two Cadillac car, according to the manufacturer.

NEW AVIATION PRODUCTS



Jet Engine Dolly

A "yellow" dolly, designed to facilitate production and maintenance work on jet engines, is one of the most developments of Twiney Franks, Inc.

The dolly already has added to the production line efficiency of testing jet engine manufacturing plants, according to the firm. Gentle handling can be avoided under the dolly frame for assembly line conveyor belt operation.

Two steel rings, from which the engine is suspended, are carried on rollers in the dolly frame. The rollers permit the rings with engine to be rotated to any work position. Rings are held rigid at the desired position by a locking foot-brake, operable from either side of the dolly.

Further security against accidental jarring of the engine is ensured by special hold-down clamps on the rings, company claims. The complete dolly weighs 378 lb.

Twiney Franks Inc., 1706 Kinross St., Cincinnati 33.



Hydraulic Clamp

A new split-flange clamp, designed to permit simple clamping of hydraulic lines, has been developed by the Anchor Clamping Co., Inc.

The part eliminates threaded joints, simplifies installation, and positively seals against leaks, says the firm. A small, automatic type wrench for assembly takes the place of big pipe wrenches and thread compounds when

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AIR TRANSPORT

Do Nonskeds Hurt the Airlines?

Revenue passenger traffic comparison, 1949-50, shows that regular airlines' business grows fastest on the two most competitive routes, served also by the nonsked air coaches.

	1949	1950	March	1949	September	1950
N. Y. Los Angeles route, AAL, TWA, and DAK.	6,661	8,171	Up 21%	7,877	11,381	Up 45%
All other routes of the same airlines	302,969	418,747	Down 19%	418,672	714,915	Up 69%
N. Y. Miami route, National and Eastern	21,234	36,887	Up 73%	11,176	18,151	Up 62%
All other routes of the same airlines	203,958	230,445	Up 13%	200,778	233,704	Up 17%

SOURCE: Figures from report of CAB Member Joseph Adams on Transcontinental Coach demand, taken from official CAB Survey of Traffic Origin and Destination, March and September, 1949 and 1950.

CAB Kills Coast-to-Coast Nonskeds Plea

- Certificates denied to 4 lines; sked service praised.
- But Adams hits Board's 'wait and see' attitude.

By F. Lee Moore

CAB has slammed the door in the face of any new transcontinental air coach candidates as "destructive and unnecessary competition" to existing long-established transcontinental airlines.

• **Praise Low Fares**—The official policy ruling in a 4-1 vote issued that the new CAB regulations are what to do about nonsked airlines would doom further large-scale supplemental services.

Specifically, the Board denied the applications for certificates filed by four nonsked airlines: Air America, California Eastern, Trans America and Great Lakes Airlines. But it made clear that these were rejected without considering their individual merits. In a dissenting policy decision, CAB said that any transportation coach service what ever, beyond that which the regular airlines see fit to schedule, is not in the public interest.

At the same time in its rounds the Board's coach opinion granted the air coach development work of American and TWA as far, and took as a precedent scope at United for holding back an coach-type service. It was the strong Board expression not for low-cost air coach service. The opinion even played for "extension of the benefits of low fare coach services to the less profitable scheduled operations and

Air Coach Load Factors of Regular Transcontinental Airlines*		
MONTH	AMERICAN	TRANS WORLD
July, 1950	95	89
August	92	89
September	90	86
October	84	87
November	78	74
December	84	77
January, 1951	85	81
February	84	77
March	91	86
April	91	87
May	94	87

* Load factor in percentage of coach seating capacity used. United Air Lines is not listed because of its limited operations in date with transcontinental coach service. Civil Aeronautics Board, June 21 report, cited by CAB Member Joseph Adams in Transcontinental Coach coach decision.

coaster routes. It is to be the common-sense attitude."

• **Adams Dissents**—CAB Member Joseph P. Adams made his pointed dissent to the Board's generalized policy opinion, although he concurred in the decision not to grant an supplemental certificate to any of the applicants in the case.

A leading airline attorney in Washington recommended that CAB's strong stand for coach development is a logical achievement of the scheduled airline pressure on the Board, then, he pointed out, the nonskeds have contributed to the national welfare and, ultimately, the scheduled airlines welfare. But he added that the majority opinion in "starkly devoid of supporting data and appears to be bound to escape congressional fire, so that the announcement was held some months until Congress should review." CAB Member Adams started

voicing his dissenting opinion last June.

One former CAB member asked for comment stated that, although he had not studied the case carefully, its problem arose among the airlines, not the CAB. CAB voted to certify nonsked air coach routes. CAB then seemed that although these would be increased competition for the regular airlines, opening up the air freight "market" would mean that "everyone's freight business would increase and the public welfare would be enhanced," the former CAB member said.

• **Policy Challenge**—Adams' dissent in the Transcontinental coach case challenges the Board's policy opinion on coach routes among them.

• **Not granting special exemptions to new air coach applicants to expand a demand type coach service subject**



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Counting Noses

- ATA to try continuing sample survey of traffic.
- If it works, system will be turned over to CAB.

Airline operations, statistics, and government regulations can seem like a volatile traffic economics analysis that they haven't had before. From a continuous sample survey of airline traffic operations and destinations they will be able to tell—on a less than a month before each airline's traffic.

- To and from each city.
- Between pairs of cities.
- By length of haul.
- Any other statistics desirable from current data on every airline's traffic pattern and passenger volume distribution.

The Research Department of Air Transport Association is developing the sample survey technique to do this now.

First test of the continuous traffic survey is scheduled for this coming March. That is the month of the next complete CAB survey of airline traffic operations and destinations.

Compare Samples—ATA Research Department will compare its open recent March sample with the full CAB count on every U.S. scheduled airline traveler's ticket.

If this first test of the sample technique proves the success observed on part of it to be, and CAB agrees it, it may replace the present bi-yearly traffic. These past March and September analyses, if they appeared at all, have come out about 1½ years late, and have been of more interest than actual results.

The sample survey could appear continuously, all year 'round and be up to date within three to four weeks, all the time. It would also be cheaper to collect, process and publish, observers believe.

Surveys Needed—The regular CAB traffic surveys of each March and September have been operated by each airline reading all in March and September traffic information to CAB each year. CAB then processed and printed the data analysis figures. But the Budget Bureau cut the CAB fiscal 1950 budget and indicated informally that they cannot save among the items that could stand waiting until they were so intricately handled.

CAB did not publish a September 1949 survey. Because the airlines need the survey, in later in they have been, the Air Transport Association decided to wait the September survey on its own. Now CAB has the March, 1950 survey



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processed and not passed. And CAB has't yet finished processing the ticket data sent it by the airlines for September 1950 over a year ago.

By this December, the ATA Research Department will have a revised and expanded the detailed sample techniques considered adequate to cover traffic of every airline scheduled in the country. These sample techniques will have been developed from and checked against known statistics of the old complete acquisition and destruction of September, 1948, March, 1949, September, 1949, and March, 1950.

ATA Research Department will then report to the industry and the industry believes the ATA developed system will reduce cost and increase usefulness of the traffic survey, then the system will be transmitted to the CAB. First done on its up to the CAB.

Test Flight—Then, ATA will have undertaken prototype development of the sample traffic survey system and even a production model to CAB. What CAB does with it will be up to the Board and the Budget Bureau.

Here are the advantages of the continuous sample survey over the present bi-yearly survey of CAB. Under the present twice yearly complete survey system, every ticket sold in March and September has been identically collected by the airlines and sent to CAB. In a year or so CAB has had time to process and perhaps print the results. The tickets taken in those two months have accounted for 17% of all tickets sold in the year.

Sample Traffic—The job came all in a lump before a year, meaning over two weeks and caused congestion on statistical facilities.

The continuous sample surveying system now under ATA development would take a total of only 5 1/2% of all tickets sold. The work load would be even more over all weeks of the year. The information would be continuous a year or two old.

The current problem: ATA researchers are making over in the smaller travel. In statistics, then, the smaller volume to be sampled, the more frequent the random sample must be to get a reasonable degree of accuracy.

ATA researchers are showing for accuracy levels of about plus-or-minus 1%.

Although the continuous sample reports could be kept up to date within 30 days of the time observed, double a government allow in the case the CAB would publish the figures that currently had it is expected CAB would do better than 60 days.

The Airline Research Conference at Atlanta Nov. 29-30 will study and approve ATA research on this project to date.

Airlines See Trouble From New Gasoline

Domestic and international airlines expect increased engine wear because of shorter life, as they begin getting aviation gasoline of higher lead tetraethyl content. Ping-pong will be a problem, they anticipate.

Domestic Airlines Association for Defense has refused to withdraw its demand to stop lead content of commercial aviation gasoline. Lead content is increased to 4.0 cc per gallon for domestic, 4.6 for international operations. It will affect airlines as local

refineries are required to put 100 octane gasoline in the tanks.

A PAD about says the high lead, gas shortage requiring the increased tetraethyl content probably will be as much as 10% in the next few months. This depends on whether the engine operators and co-ops like the Air Force, airlines agree their supply of aviation fuel.

Airport Aid Slashed

Federal aid to airport construction for fiscal 1952 will total \$14,019,607—25% less than President Truman asked Congress last fall.

It will be spread among 126 different



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SHORTLINES

► All American Airways faced a possible pilot strike last week over major and working conditions and a seating arrangement under the Railway Labor Act following incidents of unruly behavior.

► Eastern Airlines reports a nine-month net profit of \$1,472,000—a record recently shattering January-September earnings of \$769,000 a year ago.

► British European Airways reports a profit of £245,000 for the last six months of fiscal 1952. But for a lower depreciation costing £158,000 and delay in introducing the new Tridentlin transports, the profit would have been £308,000, the company says.

► California Central Airlines has added a new daily non-stop schedule Los Angeles-San Francisco using newly acquired North 262s.

► Canadian Pacific Air Lines expects to schedule two Sydney-Vancouver flights a week with Constellation jet aircraft to be delivered late next year. Longest single stage of route is 2,000 miles. Saturday Fly Lower timetable West Coast flight will be by DC-68 with CPA gets the Aero-Constellation.

► Capital Airlines has created a permanent safety committee to place "safety" emphasis on the all-important factor of safety. Employees are urged to make suggestions. "Flight Operations Manager H. J. Rind is chairman."

► Civil Aeronautics Board has ordered modified New England Air Express to show cause why its letter of application should not be revoked for alleged "deliberate disregard of the rights and safety of the traveling public."

► Continental Airlines reports a 20% increase in domestic business and 94% gain in Bermuda business for September over a year ago.

► Continental Air Lines President Robert F. Smith says the airline approves the CAB proposal of major rule modifications. "For the past decade, Continental has successfully worked toward regulation," says Bob.

► Eastern Air Lines reports net earnings of \$1,390,000, or \$1.52 a share for the nine months to September, in its 77th consecutive year of profitable operation. "This compares with \$1,746,000 or 77 cents a share a year ago" (Continued on page 91)



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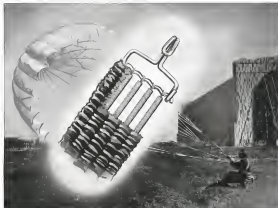
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Steel springs for all U.S. Air Force parachutes are now being made from austenitic chromium-nickel stainless steel which develop tensile strengths of from 300,000 to 350,000 p.s.i.

Five times as strong as structural carbon steel used in bridge construction, this stainless steel will resist its strength at temperatures up to 500°F.

And more important...even when temperatures fall below zero, chromium-nickel stainless offers maximum safety because it suffers no severe loss of toughness. Unlike most ferrous metals, austenitic stainless steel retains its high resistance to impact at temperatures much lower than will be encountered in this service.

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this stainless steel spring wire ensures maximum ductility and long service life. In fact, tests of stainless steel springs show from experience that there is no deterioration...no corrosion...no age embrittlement...no change in the original mechanical properties of austenitic chromium-nickel stainless steel.

At the present time, the bulk of the nickel produced is being devoted to defense. Through application to the appropriate authorities, austenitic stainless steels are obtainable for many and uses in defense and defense supporting industries.



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- (Continued from page 88)
- **El-Al**, Israel national airline, says its domestic routes from Tel Aviv to Johannesburg "if conditions in the Middle East lead to temporary difficulties in its present route."
 - **Mid-Continent Airlines** reports net profit of \$15,291 for September and \$25,956 for nine months... It declared a 25-cent dividend for stockholders of record Dec. 10.
 - **Midet Aviation Corp.** has CAB permit to operate between Florida and Grand Bahama Island for three years. In selecting Midet, CAB said the route requires a "highly specialized local service."
 - **Military Air Transport Service** India officers are studying traffic and cargo handling by Pan American, Shik, Flying Tiger Line and Trans World.
 - **Mid-West Airlines** will get about a \$1-million improvement program if CAB approves the Purdue Research Foundation proposal to buy the local service airline, according to attorney for the foundation.
 - **Northwest Airlines** must pay back \$615,830 and pay for overpayment on Pacific routes Sept. 18, 1946, to Dec. 31, 1950. Domestic payments have been about right during the period, CAB says, but adds that it is a matter of "bracket control" that the airline needed its bracket and payment in 1950, a time when the industry generally was getting second business.
 - **NWA** reports net savings of \$1,464,423 for nine months to Sept. 30 this year compared with a loss of \$773,721 reported a year ago.
 - **Pan American World Airways** Atlantic division reports a gain of 10% to 257,473 passengers served January-September this year compared with last.
 - On Dec. 7 PanAm starts first direct air service linking Central America with the U.S. West Coast by its new route Los Angeles-Guatemala City.
 - **Seaboard and Western Airlines** reports its freight traffic was 4.5% down for the third quarter of this year over last, to 6,805,380 tons under on its North Atlantic oceanic routes and as a contract carrier on the Pacific route. Biggest gain (14%) was in the commercial haul in Europe and the Middle East.
 - **Wick Airways** reports low freight rates and rapidly DOGA service helped make October its second month, with 6,654,795 ton miles earned. Expectations have declined to consolidate and streamline its management and geographical development system.



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Please send me FREE brochure describing the Conver Opportunity for me and my Complete Applicant Form.

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That Gratuities Clause

(Here's the second report on what the aircraft industry is talking about, based on all-the-wood interviews with company executives about the remedy, and on reports from our two staff members and correspondents.)

You hear everywhere in talking with industry management that the new Air Force regulations, intended to discourage procurement irregularities, are feasible in objective but unrealistic. They are almost impossible to put into practice without curtailing efficiency or saving new, more drastic substitutes.

The new regulations, already well publicized, are being followed up with revision of "costs" in a new contractual clause which spells out penalties for being caught.

According to Anthony Wren's own correspondent in Dayton, not only will the clause go into new contracts, it is being added as a rider to contracts already in effect.

These provisions are listed under a "gratuities clause," as follows:

(a) The Government may, by written notice to the contractor, terminate the right of the contractor to proceed under this contract if it is found, after notice and hearing by the Secretary or his duly authorized representative, that gratuities (in the form of entertainment, gifts or otherwise) were offered or given by the contractor, or any agent or representative of the contractor, to any officer or employee of the Government with a view toward securing a contract or securing favorable treatment with respect to the making or awarding, or the making of any determination with respect to the performance, of such contract, provided, that the existence of the facts upon which the Secretary or his duly authorized representative makes such findings shall be in issue and may be reviewed at any competent court.

(b) In the event this contract is terminated as provided in paragraph (a) hereof, the Government shall be entitled (i) to pursue the same remedies against the contractor as it could pursue in the event of a breach of contract by the contractor; and (ii) as a penalty in addition to any other damages to which it may be entitled by law, to exemplary damages in an amount (as determined by the Secretary or his duly authorized representative) which shall be no less than three nor more than 10 times the costs incurred by the contractor in providing any such gratuities to any such officer or employee.

(c) The rights and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

The subject of "gratuities" in connection with doing business with government is an innumerable complexities. What is a "gratuity" (intended with a slight snarl) and what is a normal act of business courtesy? It's a matter of motive, perhaps, but who else but the man who has it can prove it is not above approach? In these days of inadequate government salaries and a fifty-cent dollar, does a firm with a billion in backlog have a justifiable

right to buy a dollar lunch for a military officer during a talk about the business in hand? It all becomes very confusing. Can a captain be "bought" for a single dollar lunch and a general for one costing five dollars?

One industry spokesman close to one aircraft firm put it something like this. Suppose a Wright Field or Pentagon officer is ordered to a distant plant in connection with a vital production problem on a high priority airplane. He is on a per diem of \$8. He pays \$4 to \$6 a night for hotel. He must eat breakfast. He eats lunch too. Probably he turns down as invitations to the company executive dining room so he can buy his own meal and get a receipt for it, besides, the chicken is cheaper. Any company executive talking business with him also eat in the cafeteria—not a conducive spot for conducting business, incidentally. Dinner is another problem.

'How many meals can you buy—and what kind—so two to four dollars a day?' this critic asked us. Not to mention any local transportation, communications or other incidental expenses.

So what will happen? Some industry people say government long-distance phone bills will skyrocket. Why should officers consider government business with any of their own personal funds? They will try to conduct their affairs by phone, with varying degrees of complication and confusion—or they'll assign higher ratings to their or fourth echelon officers to the trips to do the job they should do themselves. There there will be more reports and rumors between the echelons and between Washington and Dayton and the company, or company officers will be transferred to Washington and Dayton at the expense of plant progress and the taxpayer, for this would be an allowable cost.

Nobody disagrees with the objectives, however. And no industry people we have talked to have been other than thoroughly sincere in wanting to operate ethically. But the present situation is very close to ridiculous, no matter how much we all want to avoid graft, favoritism, and overpricing. The only possible benefit apparent, in contrast to the disadvantages, is that these extreme provisions will focus unprecedented publicity and emphasis on grafting and acceptance of bribes. This is good, but it will not last unless the rules are rigorously enforced, and they are so strict most planners think that it is impossible.

One obvious suggestion, of course, would be for Congress to increase salary levels for government people as important categories like equipment buyers and contract agencies, and to raise the money on per diem pay for such personnel when they travel on government and contracting business in contact with industry. The entire subject deserves more thought than it has been given. The current rules are not the sole solution.

—Robert H. Wood



New Pump Motor Saves Space, Weight

A light extremely compact pump drive assembly is achieved with the new 400 cycle AC motor designed and built by EEMCO. Unlike the conventional assembly which requires a gear box for reduction, this motor connects directly in a new type of in-spool hydraulic pump which operates at 11,200 rpm. Coupling is by means of an internal spline drive within the pressure shaft. Motor size is 11,200 rpm. Coupling is by means of an internal spline drive within the pressure shaft. Motor size is 11,200 rpm. Coupling is by means of an internal spline drive within the pressure shaft. Motor size is 11,200 rpm.



TECHNICAL DATA

Motor type	3 phase 400 cycle	HP 40
Output	2 h.p. maximum at 11,000 r.p.m.	50 cubic
Weight	0.25 lb. (0.12 lb. including mounting plate)	Above 25 cubic
Efficiency	93.5%	Meets all requirements of USAF specification No. 35190

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Allison Turbo-Prop Engines Power 3 New Cargo Planes—

★ **The Lockheed XC-130**

★ **The Douglas R6D**

★ **The Lockheed R70**

While testing continues with the first U.S. Turbine Transport—the Allison Turbo-Liner, built by Convair—military contracts have been awarded for the installation of Allison Turbo-Prop engines in three additional types of transport aircraft.

★ The Lockheed XC-130—a U.S.A.F. four-engine medium cargo plane—is the first military transport ever designed originally around Turbo-Prop power. It won U.S.A.F. design competition over five other makes and the selection of Allison engines

represents another first for Allison in the development of turbine transports in this country.

★ The new Navy-sponsored R6D is a modified configuration of the world-famous Douglas DC6A Liftmaster.

★ The Navy R70 is the new turbine version of the Lockheed Super Constellation.

Allison Turbo-Prop engines were selected for all three aircraft because they develop more power with less than half the weight of present engines in this power class.



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